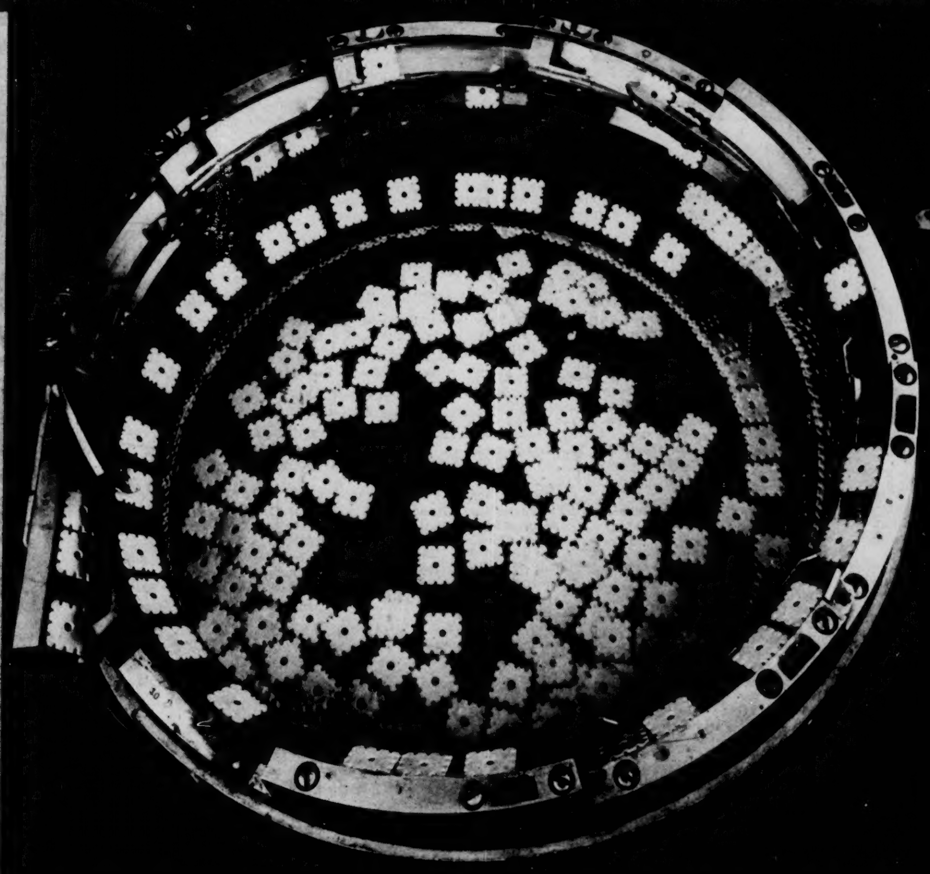
NOVEMBER 1953

News Magazine of the American Standards Association, Incorporated



"PROJECT TINKERTOY" - - A Case of Automatic Production

Electronic Equipment Mechanically Produced

During "Project Tinkertoy's" mechanized processes, electronic components are mounted on wafers. Above, a vibratory bowl feeder issues wafers for mounting. Each wafer has 12 peripheral notches, with a keying notch on one side. Exit parts in spiral channels are provided with stops that permit wafer to exit only if keying notch is in proper position to match the stop. Steps and inverting grooves placed in the channels turn and invert the wafer until key is in proper position.

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Marginal Notes

The Trend to Automation —

A couple of months ago, *Business Week's* special feature "Tomorrow's Management" described the coming automation of industry. Hard on the heels of this prophetic discussion comes announcement by the National Bureau of Standards of "Project Tinkertoy." Through this project, sponsored by the Navy's Bureau of Aeronautics, it is now possible to produce electronic equipment by mechanized, automatic production methods.

The project was declassified just in time to permit showing the film "Project Tinkertoy," as the final event of the National Standardization Conference. The Conference was held under ASA's auspices at the Waldorf-Astoria, New York, October 19-21.

STANDARDIZATION is privileged to bring its readers a description of the project released for publication by the National Bureau of Standards. The many pictures, also released by the Bureau, tell graphically how this project-of-the-future operates (page 326).

The National Standardization Conference —

Deadlines for the December issue make it impossible to prepare a report of the National Standardization Conference in time for publication in that issue. Therefore, you can count on receiving a round-up of the Conference in a special issue on the subject to be published in January 1954. The complete proceedings of the Conference will be available early in the year. Copies are being presented to those who attended all sessions of the Conference. They will be offered for sale to others. The unusually large number of interesting sessions (on company standardization, on quality control, on industrial noise, to name a few) and presentation of the Howard Coonley Medal and the Standards Medal to such outstanding personalities as Senator Ralph E. Flanders and Perry L. Houser, recommend these proceedings as a valuable book for

any standardization library. Detailed announcements will be published later.

What Do You Think of the Proposal to Standardize Sales Contracts?

The procedures for drawing up contracts have grown up over the years like Topsy — with no over-all guidance or coordination. Now, a far-thinking executive proposes that contracts covering conditions of sale be analyzed and standardized. Robert L. Fraser's proposal (page 324) is published in this issue for discussion and to stimulate recommendations from others interested.

Mr Fraser was graduated from the University of Buffalo Law School in 1940. During the war he did contract legal work in the Army, and still holds a Reserve Commission in the Judge Advocate General's Branch, the legal section of the Army.

In an article published in the October *Dun's Review and Modern Industry*, Mr Fraser makes the specific suggestion that copies of his proposed master set of standardized conditions for sales contracts be "filed with an office such as the American Standards Association."

Send your suggestions or comments to Mr Fraser, care of the American Standards Association.

With Apologies —

Seems we received a bad steer back in August when we published a frontispiece picture of a rough hobbing operation on a spline (STDZN, Aug, facing page 229). Credit should have been given to the Cleveland Hobbing Machine Company, we are now informed. We greatly regret any error in credit lines since we value highly the privilege of presenting to our readers accurate and interesting pictures of industrial equipment and processes that have a direct connection with standards.

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Our Front Cover Photo Courtesy National Bureau of Standards.

Opinions expressed by authors in STANDARDIZATION *are not necessarily those of the American Standards Association.*

Standardization

Formerly Industrial Standardization

ASA

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Published Monthly by American Standards Association, Incorporated

70 E. 45th St, N. Y. 17, N. Y. President: Roger E. Gay

EDITOR: RUTH E. MASON PRODUCTION EDITOR: MARIE McDONNELL

NOVEMBER, 1953 VOL 24, No. 11

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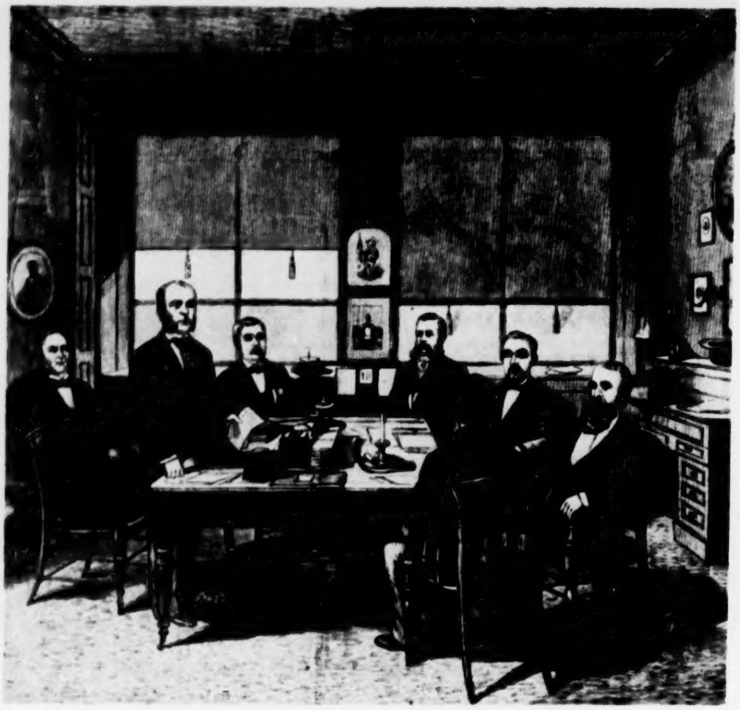
Standardization is dynamic, not static. It means not to stand still, but to move forward together.

Single copy 35¢. $4.00 per year (foreign $5.00). Schools and libraries $3.00 (foreign $4.00). This publication is indexed in the Engineering Index and the Industrial Arts Index. Re-entered as second class matter Jan. 11, 1949, at the P.O., New York, N. Y., under the Act of March 3, 1879.



Two of the Most Important Sales Contracts of the Nineteenth Century

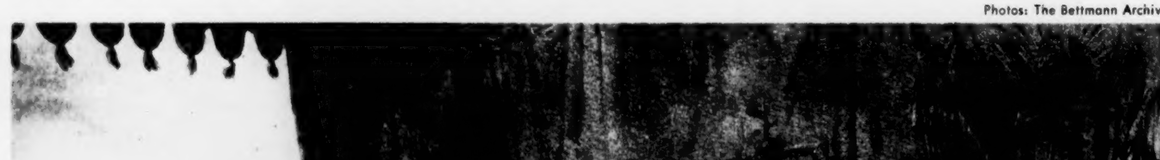
Mr Fraser's suggestion for standardizing contract conditions would pass along Twentieth Century's "savings with standards" to replace old-style processes in buying and selling.

American business has always been anxious for, and insistent upon, the elimination of needless waste in administration expenses. Constant engineering and technological advances have been made for years and have had their resulting salutary effect on business in all lines. Competition itself requires constant improvement, whether it be competition among American firms or between an American and a foreign company.

Administrative costs and expenses

Above — In the largest financial operation of the period, $50 million of U.S. bonds were purchased by a syndicate of leading bankers. The meeting shown here was held in the private office of August Belmont, New York City. (Woodcut, 1878.) Below — The 150th anniversary of the Louisiana Purchase was celebrated this year. In this painting, Napoleon is about to shake hands with the American Ambassador after signing the Louisiana Purchase contract at the Louvre, Paris, in 1803. (After a painting by Victor Adam)

Photos: The Bettmann Archive



LET'S SIMPLIFY SALES CONTRACTS

by Robert L. Fraser

Assistant to President, Lake Erie Engineering Corporation

cause concern because they not only remain constant but tend to increase due to wage raises and all other concurrent cost increases. Governmental regulations have added administrative requirements both in American businesses and in the Government itself in administering and supervising the programs.

One of the most important and constantly present administrative steps in any business transaction is the formation of the sales contract. This consists of four integral parts: (1) specifications; (2) price and other financial details; (3) deliveries; (4) conditions of sale. The first three of these items naturally differ in each transaction, although there are various standard modes of payment from which to make a choice. Each of these items, being individually adapted to the particular sale, must be agreed upon in negotiations between the purchaser and the seller.

However, the "conditions of sale" do not usually change from one transaction to another. They remain substantially the same for each individual business firm, year after year. When acting as a seller, every company has its own individually printed set of conditions on its proposal or quotation; but the same company, when acting as a purchaser, usually has a separate set of conditions more to its advantage. To further complicate the matter, many firms, when an order is received, acknowledge the order with either a repetition of their originally quoted conditions or with additional limitations printed on the reverse side of the acknowledgment letter. To offset this strategy, most purchasers request that a copy of their purchase order be signed and returned. This copy contains all of the conditions set out on the original purchase order, and so admittedly is an attempt to have the sales contract restricted to these conditions.

All of this maneuvering has a meaning. It is based on the law of contracts which, simply stated, requires an "offer" and an "acceptance" so that there is a full "meeting of the minds" on what is to be sold. Thus the conditions of the sale, such as warranties, inspection, delays in shipments, etc, are determined when the contract is formed. Most firms want their particular conditions to apply, whether they act as the seller or the purchaser. To illustrate this point, if a proposal contains printed conditions on the obverse side, and if it can be considered as an "offer," a purchaser who sends in his order, referring to the proposal and not suggesting any changes or conditions, "accepts" and completes the contract on the conditions set forth in the seller's proposal.

However, if the purchaser in his order sets out the conditions that are to his advantage, he is actually making a counter-offer which the seller may accept. If it is accepted, this completes the contract on the basis of the purchaser's conditions in the purchase order. This is a significant factor in requiring that a copy of the purchase order be signed by the seller and returned. If the seller signs, he usually agrees to or "accepts" all the conditions set forth in the purchase order.

All of this means that money is being spent on printing costs to have the conditions set out in a proposal or purchase order or acknowledgment. It also means that much time (either that of a lawyer or of some company official) is spent in looking over these printed conditions. No firm wants to enter a contract without knowing specifically its obligations and requirements. If the total of all such expenses involved in one transaction were multiplied by the thousands of purchase orders issued daily throughout the country in all companies, large or small, the cost to American business would reach a staggering figure — it can be estimated to run between $25,000,000 and $30,000,000 annually.

Is there a means of simplifying the procedure and therefore cutting down on the time consumed and the expense and the necessary manpower required in handling sales contracts? There is. It is based on a study of hundreds of sales contracts and of the forms presently used by companies, both large and small, in making such contracts. To understand the answer to this question of simplification, an analysis must first be made of the conditions that are usually found in a sales contract, whether demanded by the seller or the purchaser. These include: (1) changes in specifications and price; (2) modifications to be written; (3) inspection of product; (4) delay in shipment; (5) patent indemnification; (6) warranties on product; (7) assignment not to be made by seller; (8) applicable state law; (9) compliance by seller with various laws and regulations; (10) cancellation.

These conditions are basic to any contract and most companies differ from one another only in the wording on their proposals or purchase orders. This means, therefore, that with a little united thinking by American businessmen, *one* standard set of conditions applicable to any sales contract could be developed that would satisfy everybody and be equitable to all parties.

A standard set of conditions to be used as the model for all businesses could be maintained in a central office of a national organization (such as the National Association of Manufac-

turers, U.S. Chamber of Commerce, American Standards Association) with a copy available for the files of each company accepting the standard. If a change were made, after having been generally approved, notification in the form of a change sheet could be sent to each company so that its files would be complete and up-to-date at all times.

All companies accepting the standard conditions could indicate this in their proposal or purchase order. If there were to be any variation in the conditions for an individual contract or if a particular condition were not applicable, there could be a specific reference made to the variation or exclusion along with the specifications and other individual details.

There is no reason why such a system of sales contracts could not be accepted by American businesses within a short period of time. Some will contend that a particular condition is not individually applicable in their case but, as all American businessmen rely on the integrity and the reputation of their suppliers for good materials and workmanship, there should be no hesitation by an honest and reliable company to agree to standardized conditions that are fair and just to both a purchaser and a seller. It would be the undependable dealer who would be hesitant about accepting conditions that were not subject to various interpretations.

There is also no reason why a standard procedure and set of conditions could not likewise be prepared and accepted on all Government contracts. The master copy of such a set of conditions could be maintained at one of the central government offices, such as that of the Attorney General or the Comptroller General. Copies could be in the possession of all Government offices handling contracts and could also be initially submitted to any business firm interested or that would normally enter into contracts with an office of the Government. Any changes could be publicized in the same manner as explained earlier for businesses, so that any person or company could either know what the conditions in a Government contract were or could easily and quickly find a set of the standards and changes for reference.

Such a standard procedure for the Government would mean an additional saving of untold millions of dollars annually for both the Government and for American businesses. At present several printed copies of contract conditions are mailed to each business from which a bid is expected. Then, when a contract is awarded, additional printed copies are attached to the contract. This means that money is being spent unnecessarily in printing costs to the Government, in administrative handling expenses, in time consumed in reading and understanding the conditions, and finally in either accepting or rejecting a contract with such conditions. Once again, any specific condition not applicable to a particular contract could be eliminated, after negotiation, by reference in the contract itself.

Objections to a simplified arrangement of sales contracts will naturally be forthcoming for various reasons. However, if businessmen are sincere in their efforts to reduce administrative costs, such objections can unquestionably be answered or solved at the outset or as the system is used. The initial problems are: (1) to decide on the most applicable and widely used conditions common to all businesses; (2) to word these conditions properly for the fair and equitable protection of all sellers and buyers; (3) to convince American businessmen of the advantageous soundness of such a system.

The idea is not a complicated one. The system could be initiated and operated without great difficulty and the advantages to both business and the Government are obvious.

The opportunity to make a radical change from our present obsolete system of sales contracts is available. The decision to make the change and eliminate needless expense is for American businessmen in general. Some day in the not too distant future the only reference to conditions in any sales contract may be, "The conditions applicable to this contract are those set forth in the master copy of 'Sales Contract Conditions', dated . . . , as last amended . . . , on file with the Legal Division of the . . . Association."

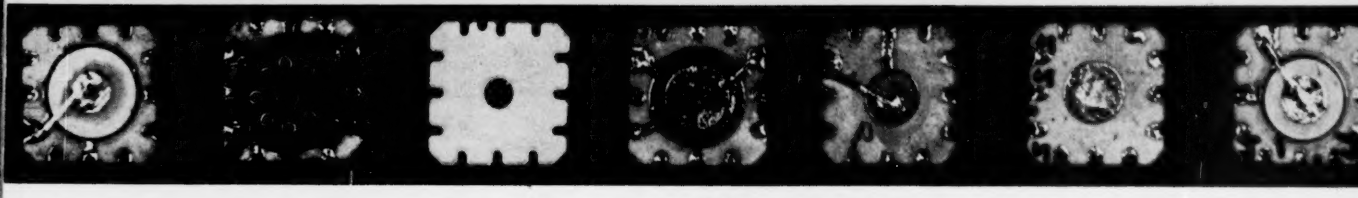
"PROJECT

An automatic production line for the manufacture of electronic products and a novel system of electronics design which makes this possible have been developed by the National Bureau of Standards. The program, code-named PROJECT TINKERTOY, was sponsored by the Navy Bureau of Aeronautics.

Starting from raw or semi-processed materials, machines automatically manufacture ceramic materials and adhesive carbon resistors, print conducting circuits, and mount resistors, capacitors, and other miniaturized component parts on standard uniform steatite wafers. The wafers are stacked very much like building blocks to form a module that performs all of the functions of one or more electronic stages. Automatic inspection machines check physical and electrical characteristics of the parts-mounted wafers at numerous stations along the production line. The completed module is a standardized, interchangeable subassembly combining all of the requirements of an electronic circuit with ruggedness, reliability, and extreme compactness.

1. Description of Project

PROJECT TINKERTOY, as the program is code-named, was begun by NBS in May 1950 and now successfully produces electronic subassemblies by mechanized means. The pilot plant is operated by a commercial contractor as part of a large-scale production evaluation program under the Bureau's technical direction. The basic objective of the Navy Bureau of Aeronautics in establishing the program was the development of facili-



Above — A few of the many types of parts-mounted wafers.

"TINKERTOY"

A New System for Modular Design and Mechanized Production of Electronics as described by the National Bureau of Standards

ties or systems suitable for rapid mobilization in emergency periods. The facilities are also dual-purposed in nature and are expected to reduce substantially lead time in production.

MDE Design System

The key to the automatic, mechanized production of electronic equipment in PROJECT TINKERTOY is the design system developed by the National Bureau of Standards. Called MDE — for Modular Design of Electronics — the system establishes a series of mechanically standardized and uniform modules (or building blocks), producible with a wide range of electrical characteristics.

Each module, in general, consists of some 4 to 6 thin ceramic wafers, bearing various circuits associated with an electronic stage. A number of individual modules are combined to form a major subassembly. The composition of modules into major subassemblies of electronic equipment is possible because there is great similarity between circuits and parts of circuits in modern electronic equipment.

Electronic assemblies consist largely of electronic tubes and arrays of simple parts (like resistors and capacitors) which account for the mass of the individual parts and are also responsible for the bulk of the manual production efforts in conventional production. These assemblies have been the chief target for redesign in the MDE system.

MPE Production System

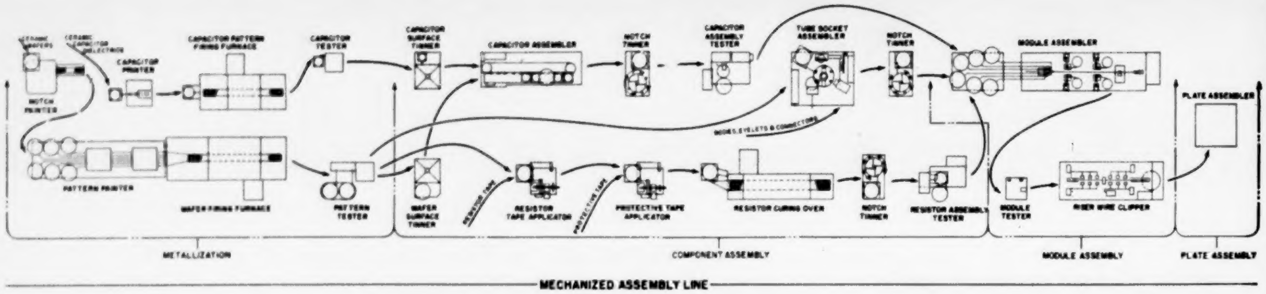
The production of modules and assemblies, designed in accordance with the MDE system, is achieved mechanically in PROJECT TINKERTOY. The production system developed by the National Bureau of Standards is called MPE — Mechanized Production of Electronics. MPE largely utilizes non-critical raw materials. Ceramic wafers — $\frac{7}{8}$ inch square by $\frac{1}{16}$ inch thick — are produced directly in quantity from the raw ingredients. Ceramic capacitors are produced in a similar fashion. Another part of the line produces adhesive tape resistors.

These and other basic parts are fed into the production line. The appropriate circuits are printed by automatic machines. The circuit configuration is achieved through photographic processing. Quality control is established by automatic inspection, directed by information prepared in punched card form. Special components, not suitable for "printing" techniques, can be incorporated into the modules. Automatic physical and electrical inspection is provided for in the production line.

The MPE system is based on the use of bulk or semiprocessed materials, and the line produces all the large-quantity parts except for the tubes. The pilot plant is designed for a production goal of 1,000 modules per

Interior of the PROJECT TINKERTOY pilot plant. Here, application of automatic machine techniques to manufacture of electronic equipment is demonstrated. The present machines manufacture ceramics, process and apply piece parts to wafers, assemble modules, and automatically perform complete inspections.

All photos used in connection with this story, courtesy National Bureau of Standards.



Schematic diagram of PROJECT TINKERTOY mechanized assembly line.

hour. Joining modules together to form subassemblies may also be accomplished by machines.

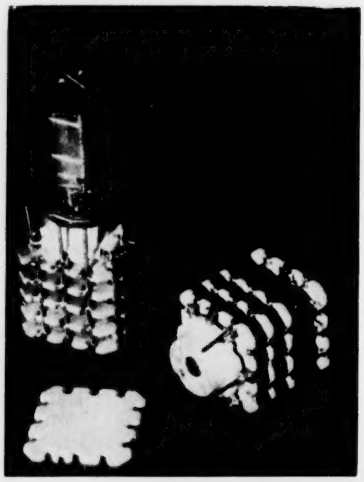
PROJECT TINKERTOY was sponsored by the Industrial Planning Division of the Navy Bureau of Aeronautics as an industrial preparedness measure. One of the serious bottlenecks in emergency periods has turned out to be the production of electronic equipment, upon which the military services are increasingly dependent for success in modern defense. PROJECT TINKERTOY indicates that lead time in production can be reduced 75 percent.

2. Modular Design of Electronics

MDE is the basis for the PROJECT TINKERTOY system. In such a system flexibility of product and the general characteristics of conventional assembly methods are compatibly combined. At the same time product standardization and uniformity — the prerequisites for economical processing by automatic machinery — are integral aspects of the system. Interconnection is relatively simple between any number of modular units. By combining modular assemblies containing different component parts (resistors, capacitors, coils, etc) whole electronic circuits may be developed to amplify signals, generate and shape wave forms, scale count, and perform customary electronic functions.

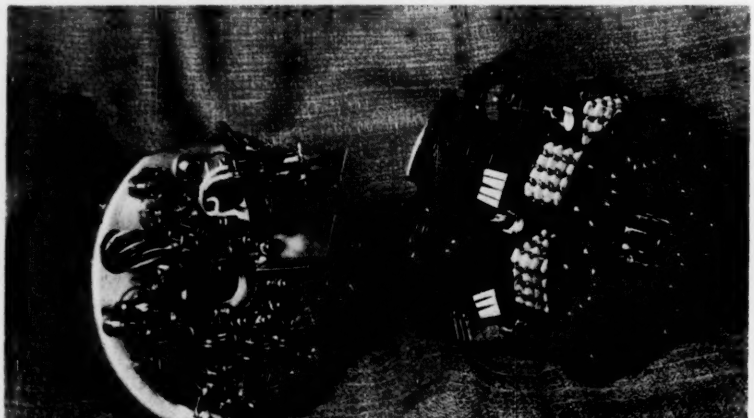
The MDE design system dispenses with the conventional circuit diagram of the tested electronic model and places all necessary production programming information on an MDE work sheet. Each work sheet contains the front and back outlines of six wafers with appropriate numbering to identify each notch in the wafer, each riser wire, and the electronic piece that is to be placed on the wafer. The engineer translates his conventional wiring diagram to an MDE diagram. He indicates the position of the piece and its proper value and tolerances. Lines are drawn to indicate how the circuits between wafers are to be connected.

The engineer's MDE work sheet becomes the basic document from which a draftsman draws an ink drawing that may be reproduced in large numbers. The draftsman also prepares a larger version of the work sheet that is photographed and is subsequently used to make stencils for the circuit printing machines. The numbers of wafers and the tube sockets listed on the MDE work sheets give an indication of the quantity of raw ceramic



At left — Two modules and a wafer. Modules are dimensionally standardized but have a wide range of electrical functions. Each is composed of four to six wafers bearing printed conducting circuits, tape resistors, capacitors, tube sockets, and other miniaturized electronic component parts.

Below — Conventional hand methods produce scramble of component parts in electronic equipment (left). Modular design brings order out of chaos in same piece of equipment (right).



materials that must be mixed. The number and value of resistors marked on the work sheets determine the production required for tape resistors.

The MDE work sheet is also used to establish the inspection procedure. Current paths on each wafer are marked on specially prepared punch cards. These cards accompany the wafers through all of the manufacturing processes. The sheet is also used in the construction of the standard modules or counterparts that are employed in the final testing and inspection of the module assembly.

3. Mechanized Production of Electronics

MPE consists of the mechanized production of ceramic wafers, titanate capacitors, and tape resistors, and their automatic mechanical assembly and inspection. In some military equipment a single chassis may have as many as 100 resistors and 100 capacitors. The facilities of the NBS PROJECT TINKERTOY plant provide for the manufacture of nearly all of these pieces from raw materials.

MPE Steatite Production

Steatite wafers and tube sockets are processed from raw materials and are stamped out at a rate of about 2800 pieces per hour. These parts are cured at 2300 F in a tunnel kiln. The wafers are then mechanically gaged, and all pieces which do not fit within close tolerances are rejected.

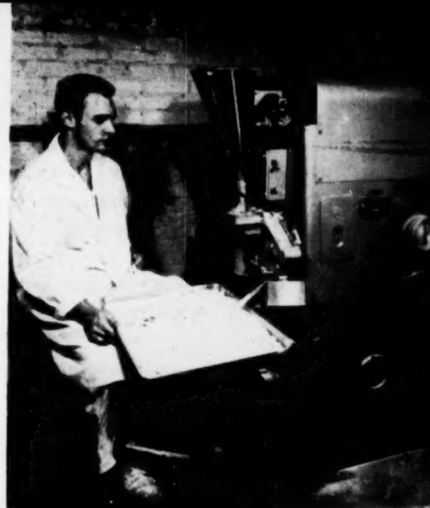
The standard wafer is pressed with twelve peripheral notches (three on a side) and a keying notch on one side. In the final module assembly, riser wires are mechanically soldered into the twelve notches and serve as physical supports for the module and electrical connectors between wafer-mounted circuits. The keying notch is a medium by which individual wafers are automatically oriented for the mechanical application of component parts.

MPE Capacitor

The titanate capacitor body is manufactured in PROJECT TINKERTOY in very much the same manner as the ceramic wafers. The capacitor is nonporous ceramic composed usually of

(*Continued on page* 330)

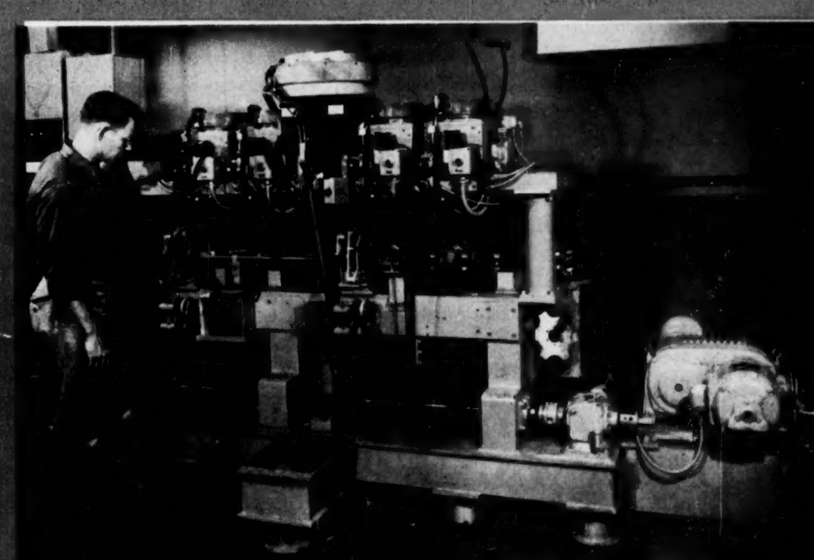
STEPS IN THE MPE PROCESS



Mechanical pressing of wafer bodies. At left—Wafers are made of a controlled combination of talc, kaolin, and barium carbonate. After thorough mixing, milling, and drying, they are pressed on this machine. Tube-socket bodies, made of same minerals, are also formed on this machine with appropriate die. After curing in firing kiln, wafers are approximately 0.875 inch square.

Wafer pattern printer. At right—As wafers issue from vibratory feeder (foreground), they pass under stencil screen. This bears circuit patterns for up to six wafers. Patterns are printed simultaneously with appropriate silver conducting circuit. Paint is partially dried in oven (background) and wafers are inverted. The unprinted surfaces are then conveyed under another stencil screen bearing appropriate circuit patterns. Patterns are physically and chemically bonded to wafer surfaces in a curing furnace. Pattern-printed wafers are inspected automatically. Appropriate inspection circuit is programmed by a punched card. This accompanies the particular batch of wafers from its initial printing up to its final assembly into a module. All wafers are loaded into a vibratory feeder which issues them oriented in same direction and with same surface up. All wafers pass under inspecting device that automatically checks and accepts those bearing the proper conducting circuits.

Capacitor-wafer assembling machine. Below—Before assembling operation, silvered portions of both titanate capacitors and wafers are given a thin coating of solder. They are then bathed and washed, leaving solder deposit only on parts that have printed silver patterns. One or two capacitors may be bonded to each wafer surface. Machine shown here issues capacitors from smaller vibratory feeders on top. Electrically operated escape mechanisms permit only properly oriented capacitors to fall into assembling jig. The first two capacitors are centered in jig by a "slave." Properly oriented wafer then falls on top of jig; remaining two capacitors are next admitted. The jig, wound with secondary windings of induction heater, is conveyed through a pair of induction heaters, where tinned surfaces are bonded together.



Robert L. Henry, National Bureau of Standards project leader, with the module inspector. After parts-mounted wafers have been assembled into a module, excess portions of riser wires are removed and unit is inspected in this machine. A punched card programs the computer circuits. The electronic system inspects each circuit or component part mounted on wafers and compares it with a standard. Mr Henry is holding a module complete with vacuum tube. This unit conceivably can perform all necessary electronic functions of one or more stages in a conventional radio receiver.

(Continued from page 329)

magnesium, barium, calcium, and strontium titanates of high purity, organic binders and water. After firing, it is about ½ inch square and ²⁄₁₀₀ inch thick. The capicity values may be varied from 7.0 micromicrofarads to 0.01 microfarad by changing the relative proportions of the constituent minerals. Raw material batches weighing about five pounds will produce about 100,000 capacitors.

MPE Tape Resistor Production

The materials required for the manufacture of tape resistors in PROJECT TINKERTOY are a heat-resistant asbestos paper tape known as Quinterra, polyethylene tape, carbon black or graphite, resin, and a solvent. The resistor formulation (a mixture of the carbon, resin, and solvent) is ground to a fine adhesive powder. The compound is then sprayed on a loop of Quinterra tape, and a protective coating of polyethylene tape is applied. The tape is slit into five or six narrow strips and stored on rolls in a refrigerator. A 75-foot roll of tape will produce over 10,000 resistors. The tape resistors produced have a range from 10 ohms to 10 megohms. They will hold their rated resistance within ± 10 percent up to temperatures near 200 F and are capable of ¼-watt power dissipation at the operating temperature.

MPE Metallizing

Metallizing is the name given to a series of operations in the PROJECT TINKERTOY plant in which appropriate sections of the wafer or capacitor body are silver-painted. During these stages, circuits are printed on the wafers, notches are coated, conducting surfaces and leads are applied to capacitors, furnace-curing takes place; and circuits are inspected. Finally, all silvered surfaces receive a thin coating of solder. All of the operations are mechanized.

MPE Materials Handling

The keying notch pressed into each wafer is initially used during the metallizing operations. The wafers are loaded into vibratory bowl feeders provided with spiral escape channels. A series of four exit ports followed by steps are set into the channels. A small screw is inserted into each exit port that permits only those wafers to pass if the key is aligned with the screw. If the wafer is incorrectly oriented, it is turned 90 degrees as it falls down the channel step following the exit port. A specially grooved channel inverts the wafer if it has failed to pass through the other four ports, and the keying procedure is repeated. As a consequence, all wafers passing from the feeders are oriented in the same direction and have the same surface turned upward.

Another feature of the vibratory bowl feeders is the mechanism that controls the quantity of wafers being issued. The issuing channel is provided with a photo-electric cell that functions only if the light path is completed. If the channel is not filled with wafers, the completed photocell light path energizes the circuit causing the bowl to vibrate. When the channel is full, the bowl automatically stops vibrating and, therefore, issuing wafers.

MPE Components Assembly

Tape resistors, titanate capacitors, tube sockets, and other miniaturized parts are mounted on the wafers between the appropriate silvered conducting patterns. Rolls of resistor tape are placed on a machine that automatically cuts the tape into one-half inch lengths, presses the resistors between the printed electrodes on the surface of the wafer, applies pressure, and ejects the completed resistor-mounted wafer. As many as two resistor tapes may be applied to each wafer surface.

A single machine is used to mount up to two capacitors on each surface of a wafer. Each capacitor is automatically oriented and the silvered circuit on both surfaces is electrically tested before mounting. For example, if four capacitors are to be mounted on a wafer, the first two are dropped into a conveyor-driven jig. They are followed by a slave that centers the capacitors, and the properly oriented wafer is added. The remaining two capacitors are dropped on top of the wafer. The jig is conveyed through a pair of induction heaters that cause the tinned surfaces on the parts to bond.

In the tube socket assembler, silvered tube pins are mechanically placed into their proper holes in the steatite tube socket, a wafer is placed on top of the socket, and a rivet binds the two pieces together.

After the various parts have been mounted on the wafers, the notches on the wafer are tinned with solder. The machine that performs this operation automatically grips each component-mounted wafer and dips one side into flux and solder. The tinning operation

is repeated on the other three sides after successive 90 degree turns of the wafer.

MPE Module Assembly

Uniform wafer-mounted component parts, including wafer-mounted coils, toroids, potentiometers, and crystals are now ready for assembly. The complete assembly of the module is accomplished in a single machine. Six vibratory feeders issue the wafers to a loading device that holds the wafers in an upright position between specially designed jaws. A chain drive carries the jig to a soldering position at which six riser wires are guided into appropriate notches, three on a side. The mechanism brings soldering irons into contact with the unit and bonds the wires to the notches. The unit is turned 90 degrees, and the chain drive carries it to another soldering position where six more wires are bonded to the module. After final electrical inspection, segments of riser wires are severed where circuit isolation is required between wafer-mounted circuits.

MPE Automatic Inspection

During each stage in the mechanized production of electronics, provision is made for 100-percent automatic inspection. This is both a physical gaging and an electrical comparison. Printed circuits, resistors, and capacitors are compared with their electronic equivalents both before and after assembly. This is accomplished by use of electronic computers, bridge circuits, and other comparison devices. The inspection "code" is contained on the punched cards which were prepared by the design engineer and have accompanied the wafers all through the production process. After the final assembly of the module the whole circuit is again tested to see that it meets specifications within set tolerances.

Final Assembly

The final assembly operation need not necessarily be considered a part of the Mechanized Production of Electronics. Normally, a set of modules (as many as ten) are mounted on or between copper-clad base plates. Circuits have been etched into the copper surface and connect the riser wires of the several modules to form a complete electronic circuit. Several such plate assemblies may form an equipment. One base plate with six modules, for instance, contains all the necessary circuits to make a six-tube radio receiver function properly.

4. Industrial Preparedness

Industrial mobilization and preparedness have been studied by the Industrial Planning Division of the Navy Bureau of Aeronautics for many years. In studying the electronic industry it was concluded that, in the event of a national emergency, costs for production and maintenance of electronics would be formidable in view of the quantities and varieties of needed gear. Consequently the Navy Bureau of Aeronautics decided that the only solution to the problem of satisfying the huge demands for electronic equipment was a mechanized production system.

The Navy turned to the National Bureau of Standards in 1950 for the solution of these industrial mobilization problems. The National Bureau of Standards had engaged in pioneering work in printed electronic circuits, stemming from problems arising in its proximity fuze work during World War II. Prior to 1950, the Bureau had developed a modular design concept, tape resistors, special circuit printing techniques, and hand-machines for printed circuits in connection with various research and development projects. Problems on miniaturization and ruggedization of electronic equipment had also been under study for some time.

The first modular design of military electronic equipment had been completed by NBS in 1949, when a radar intermediate frequency assembly had been designed and constructed. A careful study by the Navy in 1950 indicated that "the most advanced state of processed circuitry is available at the National Bureau of Standards." The NBS system was particularly compatible with military environmental requirements, and stressed maximum use of raw materials rather than pre-processed component parts. The major objective of the program became the design and construction of a pilot plant compatible with the principles of Modular Design of Electronics.

PROJECT TINKERTOY makes possible a rapid conversion from civilian to military products (and back again) on short notice and, concurrently, allows a greatly expanded production capacity. Delays caused by the need for recruiting and training new production personnel and the procurement of new mechanisms and parts are eliminated. Most of the operating "know-how" is stored in mechanical fingers and electromechanical control mechanisms, and even electronic equipment designs may be stored, ready for production, in the form of punched cards and circuit stencil screens.

Because PROJECT TINKERTOY largely utilizes unprocessed or bulk materials, the system is comparatively free from dependence on particular components in critical supply. The Mechanized Production of Electronics results in a very high production rate. Uniformity of electronic products at a high quality level is enhanced by the mechanized production and by 100 percent automatic inspection. This affords the possibility of repair and maintenance of electronic systems by replacement of unitized packages or entire subassemblies.

Performance of equipments produced in PROJECT TINKERTOY appears generally equivalent to that obtainable from conventional assemblies. Equipments produced on an experimental basis meet military environmental requirements, passing such tests as shock, vibration, temperature, and humidity established in military specifications. Moreover, the standardization and uniformity achieved by the MDE wafer-component and stacked-wafer design result in production outputs of uniformally satisfactory equipment, whose characteristics both physically and electrically are carefully controlled through the 100 percent automatic inspection machines that are an integral part of the production line.

The final design and subsequent construction of many PROJECT TINKERTOY machines called for the services and assistance of industry at a time when the Korean emergency

had preempted most machine-tool and related facilities. The Navy and the National Bureau of Standards were able, however, to secure the cooperation of several companies with available facilities and staff.

Basic conception and development — as well as early background research — were contributed by the National Bureau of Standards, including solution of new process and materials handling problems, design of the pilot plant and much of its equipment, and technical direction of all phases of the program. While some of the plant machines were designed and constructed by NBS, the major part of the design and construction of the production equipment was done by the Kaiser Electronics Division of Willys Motor Company. Some special machines were also designed and built by the Doughnut Corporation of America (Ellicott City, Md). Specially designed automatic production test equipment was obtained principally from Communication Measurements Laboratory, Inc (Plainfield, N. J.). Some major engineering applications to equipment were made by Sanders Associates, Inc (Nashua, N. H.), including environmental studies of MDE units. The Davies Laboratories (Riverdale, Md) and the Navy Post Graduate School (Monterey, Calif) also gave assistance in some phases of the work. Acknowledgment is also due to many companies and individuals who contributed auxiliary services and supplies.

Reference Data

Additional information on the techniques developed for PROJECT TINKERTOY is available in the following selected references:—

"Printed Circuit Techniques," NBS Circular 468 (1947). Government Printing Office, $1.25

"New Advances in Printed Circuits," NBS Miscellaneous Publication 192 (1948). Government Printing Office, 45 cents.

"Electronic Miniaturization" (NAer 00685, National Bureau of Standards Final Report), OTS Report No. PB-100949 (1949), 189 pp, $4.75

"Printed Circuits" (NAer 00686, National Bureau of Standards Final Report), OTS Report No. PB-100950 (1950), 99 pp, $1.75.

'A Subminiature Low-Frequency Radio Re-

(Continued on page 343)

ALCOA'S EXPERIENCE WITH STANDARDS

Excerpted from an address at a Purchasing Conference, Department of the Navy, by Thomas D. Jolly, vice-president, chief engineer, and director of purchases, Aluminum Company of America.

SOME years ago we started an item-by-item study of the materials in our stores, with the idea of creating a single stores catalog. In four years we eliminated 19,000 items in three plants alone. Naturally this made for a tremendous saving in inventory investment. It meant less storeroom space. It increased the efficiency of the purchasing department, the stores department, and the operating department. Bear in mind that we in industry have to charge 20 percent additional carrying charges on this material, because of taxes, handling, depreciation, and all the other factors that affect the cost of carrying materials in stock.

Let me show you how this worked out in savings. At one plant alone — one of the small plants, too — we had 10,842 items in the storeroom and 20 employees, which meant that each employee handled 542 items. After one year, by 1944, we had reduced the figure by 1,424 items. By 1950 we had it down to 8,383 items and 10.6 employees. Each employee was handling 250 more items than he handled at the beginning of the program.

In addition to that, the reduction in the stores inventory and the standardization that we effected led us to put in International Business Machines for handling our stores. We saved $1,077 a month on clerical work involved in keeping track of the items.

We started this program with the idea of reducing the number of items in stock, but that wasn't the sole purpose nor even the primary one. The important thing was to have each item cataloged in the best possible manner for the purpose intended. We were not looking for the most expensive item, nor the lowest priced; we were looking for the one that was just right. But when we started to do that, we found some peculiar things. We found that some of those things had been put in by prejudice, some by "hunch," and some on unsupported opinion — that is, for no good reason at all.

On the other hand, some of the reasons for first putting in these items were perfectly good at the time but were obsolete at the time of our study. Cold-rolled steel was one of the items. Back when the specification was written on that, we had a lot of line shafting around the plant. When you cut a key-way on a piece of cold-rolled steel that has not been turned and ground, the stress is relieved on one side of the piece, so that it bows up in a dog leg and cannot be used. So we had to order all cold-rolled steel turned, ground, and polished to get it down to an accurate size. That took away all skin-stresses, and you could cut key-ways anywhere you wanted.

The only trouble is, we do not use line shaft any more. Since there are no more key-ways to cut, there is no reason any longer for skin-relieving. But for years after we stopped cutting key-ways, we still ordered pieces that were turned, ground, and polished.

We had 40 types of babbit metal and reduced them to four. We had about 17 varieties of drill rod. One English-born tool-room foreman insisted that no other drill rod was "possible" in his plant than the one he was ordering. Unless it came from Stubbs of Sheffield, he just couldn't use it. And there were other things just as ridiculous as that.

We started with the various things

we bought, but we also changed many of the pieces we manufactured for use in our plants. We had three sets of standards for die blocks, for instance, in three different plants. We made one standard for all three plants. By doing that, we increased the quantity purchased of the one standard to the point where we could make use of improved machine tools.

To show you how that worked, let me take one standard size of die. It is 8 inches in diameter by $1\frac{1}{2}$ inches face. On the engine lathe we used to take 78 minutes to turn one die blank. By increasing the volume, we could put it on a turret lathe and do it in 26 minutes instead of 78. But then business picked up and we needed more of them. We got a multimatic machine, and now we make them in 2 minutes 20 seconds each.

Now that saved us — and eventually our customers — a considerable sum of money; but just as important to both of us, it saved 17,060 manhours in a year. And that was at a time when skilled machinists were almost impossible to get.

We organized a spare-parts pool in which we carried one spare part that would be suitable for two or three different plants. Thus we saved a tremendous investment in the spare parts.

Other savings have been produced by that saving in spare parts. Back in the old days, when we obsoleted a machine, we generally had a storeroom of spare parts left over. That has been eliminated by standardization of parts. It still occurs, of course, when special items are required.

Wherever possible, we now use a company standard if no other is available. We prefer an industry standard above a company standard. Best of all is a *national* standard. There are ASTM, ASME, and many other good standards. But when you get an American Standard, you get a standard that has been approved by all these organizations. Thus it should be used more generally, produce a better product, and effect lower costs.

That doesn't always work, however, and the reason it doesn't work is that many people do not always accept and use an American Standard. The use of these standards is voluntary, and that is the way we want to keep it. But unless we get full and complete use, we do not get maximum benefits throughout the economy.

Let me give you an example of this. Back in 1941 a half-dozen groups sponsored the standardization of manhole covers — the telephone group, the American Foundrymen's Association, the American Society of Line Engineers, the Gray Iron Foundrymen, the National Foundrymen, and the Department of Commerce. A manhole cover is a simple little piece of industrial equipment. It would seem obvious that if experts got together and worked out a national standard for manhole covers and frames, everyone would adopt it.

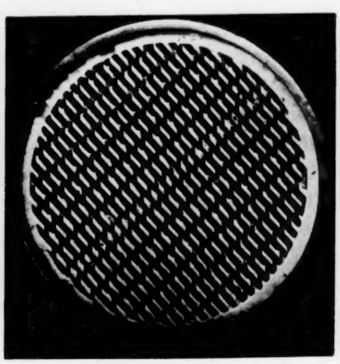
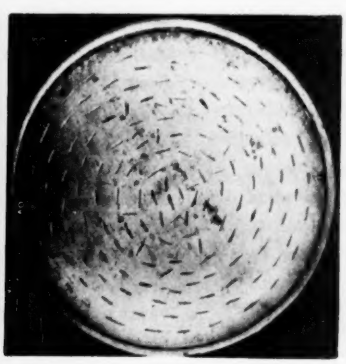
Two years ago I heard a report by a man who had looked into this matter. He found that Annapolis had a manhole standard all its own. It is understandable, therefore, that West Point should have *its* own standard. But the Public Buildings Administration, the Veterans Administration, and the Treasury Department each had its own separate standard for manhole frames and covers. So did the Philadelphia Navy Yard, the Brooklyn Navy Yard, the Army Engineers, and the Construction Quartermaster.

The Civil Aeronautics Administration had one standard for LaGuardia Airport, a different one for National Airport, and still a different one for Hickam Field. The City of Philadelphia had its own standard, but neither the Philadelphia Electric Department nor the Philadelphia Water Bureau could use it. The Highway Departments of New Jersey, Pennsylvania, Delaware, and Maryland each had its own manhole standard. So did the cities of New York, Detroit, Philadelphia, and Chicago.

One foundryman stated that he had to carry 134 patterns for manhole covers. He said he could reduce his price 30 percent if everyone would take the American Standard.

After I heard that report, I went back home and asked our boys if we had adopted the American Standard. They said yes, in every plant except New Kensington. I asked them, "What's the matter with New Kensington — why can't they use the same thing everyone else uses?" So they brought me the drawing of the manhole covers used there.

Now that's where I started with the Aluminum Company years ago — in New Kensington. And I had forgotten all about it, but that drawing said: "Designed by Jolly, Drawn by Jolly, Traced by Jolly." Here you will recognize a little of that old Navy loyalty. The boys weren't going to let me down by using an American Standard over one designed by Jolly. I swear I didn't know then how to design a proper manhole frame and cover. I still don't know.

Manhattan's 30,000 manhole covers are in various designs and sizes. Herbert Hoover's long - ago idea of standardizing was abandoned due to estimated $3,000,000 cost.

Marvin E. Newman

Acoustics Committee At Work

Report of the outgoing chairman of American Standards Association Sectional Committee on Acoustics, Vibration, and Mechanical Shock, Z24, for the period 1950 — 1953

by Leo L. Beranek

Starting in 1932 with a scope limited to development of standards for terminology, unit scales and methods of measurement in acoustics, Committee Z24 has an impressive record of performance. At present it has completed twelve American Standards on terminology and measurement. Now, in addition, one important part of its activity is in the relatively new field of shock and vibration, and a number of its projects are in the fast growing field of psycho-acoustics.

The first meeting was called in May 1932 under the chairmanship of Professor V. O. Knudsen of UCLA. A program of action was formulated and members were appointed from representative groups interested in the subject. Numerous changes in both the personnel and the organizations represented have been made since.

In May, 1942, the scope of the work was extended to include vibration.

The first 18 years of the committee's life were under Professor Knudsen's chairmanship. Standards were produced on acoustical terminology, noise measurement, sound level meters, standard microphones, and the calibration of standard microphones and earphones. Professor Knudsen's excellent leadership during the formative years laid a sound and effective foundation for the committee.

When I assumed the office of chairman in 1950, there were four standards committees with the titles Terminology, Basic Acoustical Measurements, Sound Level Meters, and Audiometers. These committees were doing excellent work. However, it was apparent from the experiences of their chairmen that it was not possible for a committee to deal successfully with more than one topic at a time. Also, it was apparent that the scope of Z24's operation would need to be expanded to take account of the increased activity in the field of acoustics. A further need was for an automatic system of retiring committee personnel who had during the years of their tenure grown away from the subject.

At my instigation, as vice-chairman of Z24, a new system of operation for the committee was voted into existence during the final year of Dr Knudsen's chairmanship and was started in June, 1950. Under this system, the membership of Sectional Committee Z24 sits in plenary session twice a year with power to start new projects, to approve drafts of standards, and to discharge projects either after completion of a task, or for failure of a project to perform. The chairman of Z24 has power to establish exploratory groups and writing groups from time to time as necessary. An exploratory group is appointed whenever it is felt by Z24 that a subject may be ready for standardization, but that the direction in which the standardization will go is not clear. An exploratory group is normally established for a term of one year at the end of which its report must be submitted. Writing groups are established to produce a written standard for study and approval of Sectional Committee Z24. Their terms are normally three years.

Because Z24 is sponsored by the Acoustical Society of America, the administrative staff is chosen by that society. This administrative staff consists of four members, each with a tenure of four years so that one member changes each year. During the three years reported here, the members have been K. C. Morrical, F. F. Romanow, H. M. Trent, R. W. Young, L. Batchelder, and the chairman. We were particularly saddened by the death of Keron C. Morrical who was standards advisor to the Acoustical Society of America and who contributed much to our standards program.

During the past three years, 21 writing and 18 exploratory groups were appointed. Of these, 7 writing groups and 15 exploratory groups have completed their assignments and have been discharged. Eight standards have been written, six of which are in print.[1]

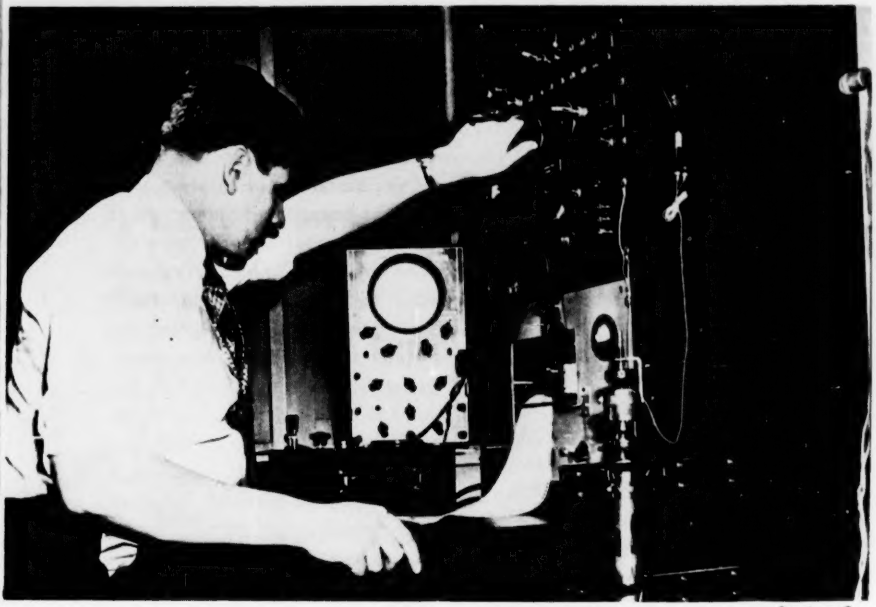
At the present time standards are actively being prepared on the calibration of microphones, shock and vibration terminology and instrumentation, transmission of sound through building structures, sound level meters, calibration of underwater transducers, ultrasonic diathermy apparatus, loudspeaker testing, articulation testing, loudness and loudness levels, measurement of noise, testing of ear protectors, testing of bells, and several types of shock testing machines.

Of the three exploratory groups, the

Dr Beranek is head of the Acoustics Laboratory, Massachusetts Institute of Technology, Cambridge, Mass.

[1] The total list of standards now available and their prices are:—

Z24.1 -1951	Acoustical Terminology	$1.50
Z24.2 -1942	Noise Measurement	.50
Z24.3 -1944	Sound Level Meters for Measurement of Noise and Other Sounds	.50
Z24.4 -1949	Pressure Calibration of Laboratory Standard Pressure Microphones, Method for the	.75
Z24.5 -1951	Audiometers for General Diagnostic Purposes	.50
Z24.7 -1950	Apparatus Noise Measurement, Test Code for	.50
Z24.8 -1949	Laboratory Standard Pressure Microphones, Specification for	.50
Z24.9 -1949	Coupler Calibration of Earphones, Methods for the	.75
Z24.10-1953	Octave-Band Filter Set for the Analysis of Noise and Other Sounds, Specification for an	.50
Z24.12-1952	Pure - Tone Audiometers for Screening Purposes, Specification for	.50
Z24.13-1953	Speech Audiometers, Specifications for	.50
Z24.14-1953	Measurement of Characteristics of Hearing Aids, Method for	.50



Sonotone Corp

Artificial ear (right foreground), constructed and calibrated in accordance with American Standard Z24.9-1949, is being used to test a hearing aid receiver.

most important at this moment is Z24-X-2 dealing with Bio-and Psycho-acoustic Criteria for Noise Control. A preliminary report was presented by this committee in October at the Fourth National Standardization Conference in New York City on the vitally important subject of noise levels and their relation to hearing damage.[2] It is expected that this exploratory project will be converted into one or more writing projects.

At the Spring 1953 meeting of the Acoustical Society of America, the scope of Z24 was modified to read as follows: "Standards, specifications, and methods of measurement and test in the fields of acoustics, vibration, and mechanical shock, including terminology, units, scales, and levels, and relations to safety, tolerance, and comfort."

Mr Laurence Batchelder of the Raytheon Manufacturing Company was appointed chairman, his term starting 1 July 1953. In addition, the executive council of the Acoustical Society of America appointed Professor Cyril Harris, Columbia University, to replace F. F. Romanow whose term was completed. The current membership from the Acoustical Society of America on Z24, in addition to the chairman, consists of H. M. Trent, Naval Research Laboratory, Washington, D. C.; R. W. Young, USN Electronics Laboratory, San Diego; and C. Harris, Columbia University, New York City.

There will be considerable activity in the next few years. An important part of the activity is in the relatively new field of Shock and Vibration as 8 of the 23 writing projects now under way are on this subject. A number of remaining projects are in the fast growing field of psychoacoustics.

With this number of writing and exploratory groups, administrative difficulties may arise due to the limited time available from the four representatives of the Acoustical Society. Mr Batchelder plans one of his first items of business to be a study of the committee's operation. The composition of Z24 may need to be modified to handle the increased scope of activity. However it may be organized, there is no doubt that the committee will continue to do important work.

In conclusion, I wish to express my most sincere thanks to the many members of writing and exploratory groups who have unselfishly given their time and effort to furthering the cause of standardization in acoustics.

[2] Copies of the complete report will be available from ASA late in November at $1.50 per single copy.

What Causes "Unusual Accidents?"

"Rulings on Unusual Accidents" reported in STANDARDIZATION are being utilized in *National Safety News*, to determine the causes for, and how to prevent, such accidents. Under the American Standard Method of Compiling Industrial Injury Rates, Z16.1-1945, the Committee of Judges of Sectional Committee Z16 may be asked to rule on whether an injury should be counted in the accident rates. Their appearance in the safety record helps to bring immediate action to eliminate the hazard. Other American Safety Standards aim at the prevention of such mishaps.

Describing cases reported in STANDARDIZATION, Robert D. Gidel, senior engineer of the Industrial Department of the National Safety Council, analyzes each injury with the aim of "determining *why* did it happen and *how* can we prevent a recurrence." Mr Gidel asks whether the existing safety measures had been well-publicized, posted, and explained to the workers.

In one case a worker had deliberately blocked the operation of a safety device which had inconvenienced him in his work. Mr Gidel questions the company's assertion that the worker understood what might happen if the safety spring was crippled. He further suggests that supervision from the safety viewpoint might have been faulty, since the violation was not discovered until the worker had been injured.

In several cases Mr Gidel inquires why the history, both physical and psychological, of the worker, was either unknown or disregarded. He finds that accidents result often, in these cases, from improper use of mechanical devices, ineffectiveness in instruction and publicity, and the negligence of safety officers. His "Cases for Comment," read in conjunction with the STANDARDIZATION feature, emphasizes the potential value of the American

(Continued on page 351)

STANDARD LANGUAGE FOR NUCLEAR SCIENCE

by Dr R. C. Gibbs

Chairman, Glossary Conference of the National Research Council

Glossary of Terms in Nuclear Science and Technology. Proposed American Standard Z63. Nine sections in spiral binder, $7.00. Individual sections: Physics, Section I, $2.50; Reactor Theory, Section II, $1.50; Reactor Engineering, Section III, $0.75; Chemistry, Section IV, $0.60; Chemical Engineering, Section V, $0.60; Biophysics and Radiobiology, Section VI, $0.60; Instrumentation, Section VII, $1.00; Isotopes Separation, Section VIII, and Metallurgy, Section IX, $1.20. (Prepared under the auspices of the National Research Council; published by the American Society of Mechanical Engineers. Available from the American Standards Association.)

THE new developments based on the use of nuclear energy have reached sufficient maturity for agreement on a standard language. Many nationally recognized scientists have been working together for the past five years under the leadership of the National Research Council to provide such a language. Now, with publication of Section I on Physics, last of the sections to be completed, the entire glossary is available. Published in nine sections, and bound together in a spiral ring binder, the Glossary of Terms used in nuclear science and technology has been issued as a proposed American Standard. It provides standard definitions for terms used in physics, reactor theory, reactor engineering, chemistry, chemical engineering, biophysics and radio-biology, instrumentation, isotopes separation, and metallurgy.

After a period of trial use, during which it is hoped that constructive comments and criticisms will be offered, the glossary will be revised and published in a single volume.

Faced with the rapid growth of new concepts and new techniques during and after the war, scientists coined new terms or adapted old ones to the new ideas. Since there was at first no clearing house for coordination of the new terms, a word used in one field of nuclear science sometimes was given a different meaning from that in another—or, in some cases, a different term was used for the same idea by different groups.

Soon after the end of the war, far-seeing engineers and scientists took steps to avoid the confusion that would result when atomic energy would be put to use in power plants, by medical organizations, and in industry. They recognized that, before specifications and codes could be developed for the application of atomic energy, it would be necessary to agree on standard terminology. Many organizations, looking forward to putting this science to use, started work to define their terms. The American Society of Electrical Engineers, the American Society of Mechanical Engineers, the Institute of Radio Engineers, the American Medical Association, the Atomic Energy Commission, the Armed Forces Special Weapons Project, and the National Research Council all set up committees to develop glossaries of terms.

All this work was brought together in one coordinated effort, following conferences called by the National Research Council in 1948. These conferences were attended by representatives of some 33 scientific and technical societies and Government organizations. They agreed to cooperate in a single attack on the problem with the National Research Council acting as coordinating organization. In close cooperation with the Nuclear Energy Glossary Committee of the American Society of Mechanical Engineers, procedures for bringing all the important organizations into the work were developed by the National Research Council. To be sure that the terminology agreed upon represented the best thought in every field, committees of top scientists were selected by the Council to act as critics of each section of the glossary. After criticism by this selected group of scientists, a review committee checked the work on each section.

Recognition of this national coordination of viewpoints has been given by the American Standards Association, and each section is published as a Proposed American Standard. Through arrangement with the American Society of Mechanical Engineers' Committee on Nuclear Energy Application, the Proposed American Standards have been published by ASME.

The terms defined in each section of the glossary are those that apply directly in the field of nuclear energy. Only those terms have been included that are used in a different sense or with a different emphasis from that most commonly understood in other connections. In some cases, however, terms are included that are used so infrequently as to be unfamiliar even though they are used elsewhere in the same way.

Each volume of the glossary (with the exception of Section II) contains an alphabetical arrangement of terms with an indication as to the section in which each term can be found. In some cases, terms appear in several volumes: for example, the term "absorption curve" is defined in section I on Physics, section IV on Chemistry, and section VI on Biophysics and Radiobiology.

Anyone using the glossary is invited to send suggestions and criticisms to the chairman of the Glossary Conference of the National Research Council, 2101 Constitution Avenue, Washington 25, D. C.

The American Standards Association does not make standards — it makes standards possible. Its primary function is to provide a means by which others can write standards. It seeks to eliminate duplication and conflict among standards. It works to stimulate the work of others in this field. It assists in forming standards committees. It clears the standards to see that there is a true consensus by all parties at interest. It serves as the American member of the International Organization for Standardization, which has consultative status with the Economic and Social Council of the United Nations.—*Thomas D. Jolly*, vice-president, chief engineer, and director of purchasing, Aluminum Company of America; past president, American Standards Association.

by Samuel P. Kaidanovsky

GOVERNMENT SUPPLIERS PARTICIPATE IN THE FEDERAL CATALOGING PROGRAM

What is Supply Cataloging?

A single *name* for each different item of supply

A single *description* for each different item of supply

A single *identification number* for each different item of supply

Classification into *homogeneous groups* for supply management purposes

Publication and distribution of data essential to supply operations.

Industry Participation

The preparation of item descriptions and assignment of stock numbers for supplies and equipment purchased by the Federal Government had been until recently an exclusive function of the Government. Lately, a technique has been developed in connection with the Federal cataloging program whereby items which have not previously been procured and which may be produced by only one manufacturer will be described and identified by him when it is required as part of a contract with the Federal Government. This procedure is a very sound one, since the manufacturer has the most intimate knowledge of the equipment he produces; and the effective utilization of his technical "know-how" and experience will benefit the Government.

To achieve uniformity in the preparation of Federal item descriptions and the assignment of Federal stock numbers, Government suppliers must be provided with the necessary instructions, procedures, and other applicable documents to enable them to comply with requirements in contracts of the military departments and civil establishments of the Federal Government. By rigidly adhering to the same procedures used by the Federal Government in the preparation of the uniform Federal Supply Catalog, uniformity will be assured.

Federal Standard No. 5

Purpose.—Federal Standard No. 5, titled "Standard Guides for the Preparation of Item Descriptions by Government Suppliers," has recently been issued. It establishes uniform practices in preparing and submitting item identification data at the time of procurement.

This standard is an outgrowth of Military Standard 125. It provides a guide by means of which the Government can have items described prior to their reaching the Federal supply system. This is necessary because, with regard to military procurements particularly, many suppliers furnish items which are not presently in the system. Therefore, Federal Standard 5 sets up means whereby the supplier upon request by the Government will identify the items at the time they are produced and supplied to the Federal Government.

Development.—The standard was developed jointly by the Army, Navy, Air Force, and General Services Administration under the guidance of the Munitions Board Cataloging Agency and its successor, the Office of Cataloging, Department of Defense. Because this technique of identification is largely applicable to the military and to some extent also to the civil agencies, it was developed as a Federal Standard.

Contents. — This standard contains rules for selection of *names;* instructions for the selection of *description patterns;* rules for preparation and format of Federal *item descriptions;* and procedure for the submittal of Federal item descriptions.

Mr Kaidanovsky, Consulting Engineer, is former Chairman of the Federal Interdepartmental Standards Council, Technical Consultant of the Federal Specifications Board and editor of the STANDARDS WORLD.

Standard Nomenclature.—In developing the Federal Cataloging Program, a standard nomenclature has been established which is the "common language" in supply operations of the Federal Government. Federal Standard No. 5 contains some of the definitions which are of importance to Government suppliers in cataloging work, and may also be of interest to purchasing agents, governmental and non-governmental, and to industry in general.

What's in the Name?

Basic name.—"A basic name is a single noun or a noun phrase which establishes the basic concept of the related items which belong in the same commodity area." Basic names can be identified, as they are written with the first letter capitalized and all other letters lower case. (See Figure 1.)

Approved item name. — "The approved item name for an item is that name which has been selected, and defined where necessary, to establish a basic concept of the item or of the group of related items of supply to which the item belongs and with which it should be compared." Approved item names can be identified as they are written in their entirety in uppercase letters. (See Figure 1.)

Colloquial name. — "A colloquial name is any name, other than the approved item name, by which an item has been known and for which an approved item name has been published." Colloquial names can be identified, as they are written in lowercase letters. (See Figure 1.)

Guides for the Preparation of Item Identifications

Description patterns ("DP") requirements serve as a guide for the preparation of item identifications for all items covered by the pattern.

(Continued on page 339)

Fed. Std. No. 5

Section A—Alphabetic Index of Names CAP

Name	DP No.	FSC Code

BASIC NAME

Cap

1. (Mechanical) A protecting and/or closing part, basically circular, designed with an integral means of securing itself and must partially inclose some protruding, external portion of the item to which it is attached.
2. A head covering without a brim, with or without a visor.

cap, flashlight – *see CAP, ELECTRICAL*

cap, flight nurse – *see CAP, GARRISON*

CAP (1), FUEL TANK .... 5571 ★

A cap designed to be mounted on the inlet of a fuel tank. It may be provided with a means of allowing air to enter the fuel tank to eliminate vacuum.

cap, fuse holder – *see CAP, ELECTRICAL*

CAP (2), GARRISON .... 445 ★

cap, gasoline tank – *see CAP, FUEL TANK*

cap, herringbone twill – *see CAP, UTILITY*

projector, ceilometer – *see PROJECTOR, CLOUD HEIGHT*

PROJECTOR, CLOUD HEIGHT 729 6660

The component of a Cloud Height Set which projects visible light for use in determining the height of the cloud above the point of projection.

APPROVED ITEM NAMES

projector, film, 16 mm, silent – *see PROJECTOR, MOTION PICTURE, SILENT*

projector lifting tube (sonar) – *see HELIX TUBE, PROJECTOR RETRACTION, SONAR*

PROJECTOR, MOTION PICTURE, SILENT 1252 6730

COLLOQUIAL NAMES

An optical device which projects a succession of light images of an object upon a screen to present the illusion of motion of the original subject; normally used for audience entertainment and/or instruction.

PROJECTOR, MOTION PICTURE, SOUND 1252 6730

An optical device which projects a succession of light images upon a screen to present the illusion of motion of the original subject and has provisions for reproduction of sound from sound track on same film. May include integral amplifiers. *Excludes* loudspeakers, and separate amplifiers. *See also PROJECTION SET, MOTION PICTURE, SOUND.*

PROJECTOR, SONAR 173 5845

An electromechanical device used under water to convert electrical energy to sound energy.

projector, sound, 16 mm – *see*
PROJECTION SET, MOTION PICTURE, SOUND
PROJECTOR, MOTION PICTURE, SOUND

TANK (1), WATER, AIRCRAFT .... None 1680

FIGURE 1. (Reproduced from Federal Standard No. 5, page 4) Here detailed rules are given for identifying basic names, approved item names, and colloquial names for items as listed in Part I, Federal Item Identification Guides for Supply Cataloging.

(*Continued from page* 337)

Description pattern.—"A description pattern is a series of requirements which predetermines the nature and sequence of adequate data required to identify, with consistent uniformity, a given item or a group of items." An example of a Description Pattern DP No. 6344 for Nailing Machine, Auto-

DP 6344

1. Item name (obtain from Alphabetic Index of Names) (e.g., NAILING MACHINE, AUTOMATIC)
2. Distance between uprights (e.g., 30 in. distance between uprights)
3. State whether closed back or open back type (e.g., closed back type; open back type)
4. Number of nail chucks (e.g., 12 nail chucks)
5. Nail size range (e.g., 5d to 10d nail size range)
6. Maximum nailing and clinching range (e.g., 34 in. max nailing and clinching range)
7. Vertical table adjustment (e.g., 32 in. vertical table adjustment)
8. Operating power requirements
   a. State whether alternating current and/or direct current (e.g., ac; dc; ac, dc)
   b. Voltage (e.g., 110v; 220v)
   c. Frequency (e.g., 60 cycles)
   d. Phase (e.g., single phase)
9. Special features (list in tabular form)
10. SR-1 Specifications data
11. SR-5 The manufacturer's data

A. SR-6 A typical manufacturer's data

B. If not procured under a specification, state procurement requirements not covered above (list in tabular form)

FIGURE 2. (Reproduced from Federal Standard No. 5, page 31)

FED-STD — ITEM DESCRIPTION

Serial No.	Contract or Purchase Order No.	D.P. No.		Date
		6344	( ) — New ( ) — Amended ( ) — Previously Submitted	
Submitted By:		To:		

1. NAILING MACHINE, AUTOMATIC
2. 30 in. distance between uprights
3. open back type
4. 12 nail chucks
5. 5d to 10d nail size range
6. 34 in. max nailing and clinching range
7. 32 in. vertical table adjustment
8. operating power requirements
   a. ac
   b. 220v
   c. 60 cycles
   d. 3 phase

9, 10. N/A

11. data regarding the mfr
   a. Morgan Machine Co, Inc
   b. Rochester, NY
   d. Model 30 in. —34 in.
   e. N/A

A, B. N/A

Note. N/A—Not Applicable

FIGURE 3. (Reproduced from Federal Standard No. 5, page 32)

matic is given in Figure 2, page 339.

Item Description

Replies to the requirements in a description pattern will result in an item description.

Item description.—"An item description for an item of supply consists of the minimum data adequate to establish, directly or indirectly, the essential characteristics of the item which give the item its unique character and make it what it is, and to differentiate it from every other item of supply used by the Federal Government." An example of an Item Description for Description Pattern DP No. 6344 is given in Figure 3, page 339.

Item Identification

Stock number.—". . . stock number is the surest means of identifying an item of supply . . . (it) is the 'common language' by which all concerned recognize parts and equipments, prepare requisitions, maintain stock records, and execute shipping documents."

Federal Item Identification Guides for Supply Cataloging is a supplementary document to Federal Standard No. 5. Certain selected contractors are placed on the distribution list to receive regularly these guides; contractors not on a distribution list are furnished copies upon request to the activity designated by the procuring activity. The document contains the following sections:

Section A, Alphabetic Index of Names to Description Patterns (See Figure 1, page 338.)

Section B, Numeric Index of Description Patterns to Item Names

Section C, Abbreviations and Symbols.

Profiting from Industry Participation

The participation of industry in the Federal Cataloging Program (1) assures the accuracy of catalog data, (2) accelerates the cataloging program, and (3) provides for an efficient and economical cataloging operation.

This is an illustration of how cooperation between Government and industry brings benefits to both.

Copies of Federal Standard No. 5 are available for inspection at the General Services Administration Regional Offices, listed on page 270 of the September issue of STANDARDIZATION. Copies of this standard can be purchased from the General Services Administration Business Service Center, Region 3, Seventh and D Streets, S.W., Washington 25, D. C. Price 25 cents.

In the sixteenth century, water was raised from the mines by means of an elevating conveyor formed of a chain of metal dippers. Links were interchangeable and buckets standardized in size and shape.

From *De Re Metallica* by G. Agricola. Translated by Herbert Hoover and Lou Henry Hoover. Published by Dover Publications, Inc, New York 19, N.Y.

AMERICAN STANDARDS HELP REBUILD KOREA

From the headquarters of the Power Rehabilitation Team, Korea Civil Assistance Command, has come a request for American Standards. These standards are needed for use in procuring substation and transmission line equipment to replace equipment damaged by combat action in Korea or that has become obsolete and worn out. "All new equipment, regardless of origin, must have a high standard of quality," the request explains.

"Our American engineers have been long acquainted with your standards during their stateside work," declares the Officer-in-Charge. "The Power Rehabilitation Team's Yokohama suboffice has only recently been opened and immediate stress was put on the use of American Standards. Numerous inquiries located no source. The need for full time use of certain of these standards is urgent."

ASA forwarded copies of a number of standards specifically requested for immediate use, and suggested that the Power Rehabilitation Team also get in touch with the Japanese Industrial Standards Committee which has complete sets of all American Standards on file and available for use.

NBS CHANGES POLICY ON TESTING

On September 23, the National Bureau of Standards issued Administrative Bulletin No. 53-54 announcing its policy on calibration and testing services for the coming year. The policy statement is given in full below.

A. Calibration and Testing Services for the Public

A reduction in the appropriation of the National Bureau of Standards for fiscal year 1954 (ending June 30, 1954) has necessitated a reduction in the staff engaged in the calibration and testing services for the public. This activity is financed from the annual direct appropriation to the Bureau; and, although fees calculated to cover the cost of the work are collected, they are deposited directly in the U.S. Treasury. In order to determine the effect of this decrease in services, a meeting was held on August 3 with representatives of industry to explore methods of meeting this emergency. On the basis of the comments received both orally and by letter the policy stated below has been formulated.

In order to cause the minimum disturbance in effecting the required economy, the Bureau will continue to accept all requests for the calibration of basic and secondary standards. Definitions and examples of items in these categories are given below:

(*a*) *Basic standards* are understood to include:

1. Standards that are themselves used to calibrate other standards or working instruments, such as master gauges, proving rings for calibrating testing machines, platinum vs platinum-rhodium thermocouples, standard cells, and standard radioactive preparations.
2. Standards that are required by law or regulation to be certified by the National Bureau of Standards.
3. Standards for measurements requiring such a high degree of precision that direct comparison with the standards of the Bureau is essential.

(*b*) *Secondary standards* include such items as:

Mercury-in-glass thermometers, volumetric glassware, steel tapes, analytical weights, and base-metal thermocouples.

Since a reduction in the staff has been necessary, the backlog of some types of items awaiting calibration, which has been lowered in recent months, will increase. The Bureau will endeavor to keep this to a minimum and will lend all possible assistance to industry in establishing facilities for calibrating their own secondary standards. In certain special areas it appears that some of the more routine calibration work can be satisfactorily transferred to other laboratories and in such cases the Bureau will cooperate in making such arrangements. This is in agreement with the long-range policy to emphasize work on basic standards including the development of new and improved standards required to keep abreast of industrial demands.

Those using the calibration services of the National Bureau of Standards can help during the period of curtailed service by submitting only items actually requiring calibration by the Bureau during the current year. It should be noted that a number of manufacturers as well as commercial laboratories maintain calibrating facilities for many types of instruments.

Testing of Products

The existing policy that the Bureau will not test products in competition with commercial laboratories will be continued, and where other facilities are available only referee tests will be accepted. In areas where the Bureau has unique facilities, tests will continue to be accepted, but commercial laboratories will be encouraged to undertake this work.

Standard Samples

Standard samples will continue to be provided as in the past. The shortage in funds will prevent the preparation of new standard samples and may delay the replenishment of present standard samples that become exhausted. In view of this situation, it may not be feasible to fill requests for duplicate samples.

Following the meeting at which this policy was formulated, an industry committee met to study the curtailment of calibration and testing services.

The committee found that industry is well qualified to test and calibrate its products but that products for some of the Government services must be sent to the National Bureau of Standards. The committee concluded, therefore, that curtailment of the Bureau's service and reduction of personnel in this section would be very embarrassing to industry due to delays in having products approved and in ultimate payment for the merchandise. In addition, organizations carrying out chemical, physical, mechanical, and electrical research are dependent on the Bureau for calibrated equipment.

The committee concluded that "The National Bureau of Standards plays too great a part in our fundamental research, our national defense, and the standardization of industrial products to be ignored. This is one branch of the government service that industry should insist be maintained."

Photo: Fabian Bachrach

BODINE ON ASA BOARD

Leo V. Bodine, Executive Vice-President of the National Lumber Manufacturers Association, has been named to membership on the Board of Directors of the American Standards Association. Mr Bodine is widely known for his participation in the work of national committees concerned with forest products. He is a member of the National Advisory Committee, American Forest Products Industries, Inc; the National Association of Manufacturers' committees on Conservation of Renewable Natural Resources and on Cooperation with Community Leaders; and the Natural Resources Committee of the Chamber of Commerce of the U.S. He is chairman of this committee's Fire Insurance Subcommittee. He is also a member of the Chamber's Social Legislation Committee and a former chairman of the Public Relations Committee of his own National Lumber Manufacturers Association. He served in this capacity while he was still an executive of the Weyerhaeuser Sales Company of St Paul, before affiliation with the Association. Since 1929, Mr Bodine has worked with a number of companies concerned with lumber and wood products. In addition to the Weyerhaeuser Company, he has had experience in sales, manufacturing, distribution, and public relations with the Clearwater Lumber Company, Potlatch Forests, Inc, and Wood-Briquettes, of Lewiston, Idaho.

Mr Bodine will complete the unexpired term of R. A. Colgan, Jr, who resigned from ASA's Board because his current far western location prevented his active participation.

NEW DATA ON TRANSFORMERS

Revisions of four American Standards for transformers, just published, include additions to terminology and to the general requirements for transformers, regulators, and reactors; and a table to indicate temperature changes. They also provide additional information on loading and operation of instrument transformers. The revised standards are American Standards on Terminology for Transformers, Regulators, and Reactors, C57.10-1953; on General Requirements, C57.11-1953; and on Requirements for Instrument Transformers, C57.13-1953.

The terminology has been revised to give added information on quarter thermal burden ambient temperature.

A new table which indicates the limits of temperature rise has been added to the general requirements for transformers, reactors, and regulators.

This revised table was needed to interpret the change made in the standard instrument transformers—recognizing two standard ambient conditions for instrument transformers.

The standard requirements for instrument transformers have been completely rewritten to take into account two standard ambient conditions for instrument transformers, that is, those in the past with the standard 30 C transformer ambient and a new rating for enclosed switchgear. Another change is in the table for standard insulation classes, standard marked ratios, standard primary-voltage ratings, and standard dielectric tests for potential transformers. The former table had given ratio values above 25,000, which led to confusion. The new table, in contrast, gives the high voltage in terms of the product of the standard low voltage and the ratio.

A revised Guide for Loading and Operation of Instrument Transformers has also been issued this year. Two new tables in this Guide give the basic loading characteristics of both potential and current transformers. Although it had been approved originally as American Standard, ASA approval of this Guide has been withdrawn in line with a recently agreed-upon policy. All C57 Guides are now being issued as Appendix material. All are still available, however, as Appendices to the C57 family of standards. This policy applies to the following:

- Guide for Operation of Transformers, Regulators, and Reactors at Altitudes Greater than 3300 Feet (1000 Meters)
- Guide for Loading Oil-Immersed Distribution and Power Transformers
- Guide for Loading and Operation of Instrument Transformers (Just revised and issued as a separate document, 35 cents)
- Guide for Loading Pole-Type Constant-Current Transformers
- Guide for Loading Step-Voltage and Induction-Voltage Regulators
- Guide for Loading Current-Limiting Reactors

The new revisions should replace earlier editions in the volume of American Standards for Transformers, Regulators, and Reactors issued in 1948. Copies are available as follows:

- American Standard Terminology for Transformers, Regulators, and Reactors, C57.10-1953 — No Charge
- American Standard General Requirements for Transformers, Regulators, and Reactors, C57.11-1953 — No Charge
- American Standard Requirements for Instrument Transformers and Table of Contents, C57.13-1953 — $1.00

ASSURANCE FOR LAMP INTERCHANGEABILITY

by L. E. Barbrow

National Bureau of Standards; Chairman Subcommittee C78.1

RECENT revisions have brought American Standards for incandescent lamps up to date. Currently available are American Standards covering incandescent lamps for general service; for trains, locomotives, and country homes; for street railways; for spotlights and floodlights; infrared lamps; projector and reflector spotlights and floodlights; street series lamps; and miniature lamps.

Each of the standards covering the large lamps also makes reference to a base and bulb standard for the individual sizes.

Almost 100 types and sizes of large incandescent lamps, comprising all of those most commonly used in the United States, are covered in detail in these American Standards. This assures the consumer that any one of these types and sizes can be used interchangeably in his equipment, regardless of manufacturer, provided, of course, that the applicable American Standard is adhered to by the lamp manufacturer.

The American Standard for Miniature Lamps not only assures interchangeability of the 60 types of lamps specifically listed therein, but also incorporates a procedure by means of which uniform Trade Numbers are assigned to miniature lamps. Thus it assures the consumer that lamps bearing a given Trade Number can be used interchangeably insofar as electrical and dimensional characteristics are concerned.

The standards recently revised are:

- General Service Lamps for 115-, 120-, and 125-Volt Circuits, C78.100-1953 (Revision of C78.100-1949)
- Infrared Lamps for 115-125 Volt Service, C78.106-1953 (Revision of C78.106-1949)
- Projector and Reflector Spotlight and Floodlight Lamps, 115, 120, and 125 Volts, C78.107-1953 (Revision of C78.107-1949)
- Miniature Incandescent Lamps, C78.140-1953 (Revision of C78.140-1949)

Other American Standards also available are:

- General Service for 115-, 120-, and 125-Volt Circuit, C78.100-1949
- General Service for 230- and 250-Volt Circuits, C78.101-1949
- Train, Locomotive, and Country Home Service 30-34 and 60-64 Volts, C78.102-1949
- Street Railway Service, C78.103-1949
- Spotlight and Floodlight Service, 115, 120, and 125 Volts, C78.105-1949
- Street Series Service, C78.109-1949 •

PROTECTION FOR ELECTRIC WIRES

An American Standard to reduce repair and renewal of electric wires as a result of wear by rubbing against tree branches has just been brought up to date.

The wire specified in this standard is an especially heavy rubber-insulated wire used in areas where electric wires must be run through trees. The use of this tree wire helps to eliminate the unsightly dangling of wire wrappings.

Committee C8, which developed the standard, had primarily in mind to prevent interruptions of electric power service.

The committee is composed of representatives of 16 national organizations interested in improving quality and serviceability of wire and cable.

Copies of American Standard Specifications for Rubber-Insulated Tree Wire, C8.16-1953, may be obtained at 50 cents per copy.

REQUIREMENTS PROVIDE GOOD FLOORS FOR SEVERE SERVICE

Requirements for a floor that will stand up under severe service in industrial plants or public buildings have just been approved as American Standard. The standard is one of a group on oxychloride flooring issued this year.

These specifications provide for a floor of the terrazzo type which is extremely hard, tough, and durable. The aggregate is crushed granite, trap rock, or similar hard stone chips, and is not ground to such an extent as to produce a high polish. This type of flooring is used mostly where decorative effects are not required.

The standard gives detailed requirements for materials used in mixing the aggregate, conditioning of the area to be covered, preparation of subfloors, method of application, thickness, sealing, and the protection of the finished installation.

Also included in the specifications are methods of testing the consistency of the flooring, material, linear change, flexural and compressive strength, and method of gaging the flooring solution.

The project was sponsored by the American Society for Testing Materials and the National Bureau of Standards under the procedure of the American Standards Association.

Copies of American Standard Specifications for Industrial Granolithic Oxychloride Flooring and Its Installation may be obtained at 35 cents each.

"Project Tinkertoy"

(Continued from page 332)

ceiver," NBS *Technical News Bulletin* 35, 68 (May 1951), 10 cents.

"A High-Temperature Adhesive Tape Resistor," NBS *Technical News Bulletin 35*, 100 (July 1951), 10 cents.

"Small Continuous Furnace for Firing Printed Circuits," NBS *Technical News Bulletin 35*, 114 (Aug 1951), 10 cents.

"A New Miniature Intermediate-Frequency Amplifier," NBS *Technical News Bulletin 35*, 143 (Oct 1951), 10 cents.

"Circuit Printers for Flat and Cylindrical Surfaces," NBS *Technical News Bulletin 35*, 168 (Nov 1951), 10 cents.

"Development of the National Bureau of Standards Casting Resin," NBS Circular 493 (1950), 10 pp, 10 cents.

"Printed Circuit Techniques: An Adhesive Tape Resistor System," NBS Circular 530 (1952), 83 pp, 30 cents.

"NBS Precured Tape Resistor," NBS *Technical News Bulletin 36*, 110 (July 1952), 10 cents

"New Methods of Radio Production," by J. A. Sargrove, Journal of the British Institution of Engineers, 8, No. 1, 1 (Jan-Feb, 1947).

NBS Technical News Bulletins and Circulars may be ordered from the National Bureau of Standards, Washington 25, D. C.

Standards From Other Countries

Members of the American Standards Association may borrow from the ASA Library copies of any of the following standards recently received from other countries. Orders may also be sent to the country of origin through the ASA office. The titles of the standards are given here in English, but the documents themselves are in the language of the country from which they were received. For the convenience of our readers, the standards are listed under their general UDC classifications.

381.7 QUESTIONS RELATING TO TRADE TECHNIQUE

Austria (ONA)

Standard set of rules pertaining to trade contracts — ÖNORM A 2050

389 METROLOGY. WEIGHT AND MEASURES. STANDARDIZATION

Austria (ONA)

Preferred numbers — ÖNORM A 2750,Bl.1

Systems of measurement. General — ÖNORM A 6430

Netherlands (HCNN)

Preferred series R 5, R 10, R 20, R 40 — V 3070

Poland (PKN)

Instructions for layout of standards — N-02002

526.9 SURVEYING. TOPOGRAPHY

Poland (PKN)

5 standards for surveying instruments and accessories — PN M-54552, -54556, N-99300, -99301, -99314

53.081 PHYSICS, MECHANICS: UNITS

Austria (ONA)

2 standards for method of writing of different units and related equations — ÖNORM A 6410, -6411

531.78 MEASUREMENT OF FORCE, WORK AND PRESSURE

Sweden (SIS)

8 standards for pressure gages and details of their construction — SMS-1554/61

535.6 COLORS

United Kingdom (BSI)

Glossary of color terms used in science and industry — BS 1611:1953

539 MOLECULAR AND ATOMIC PHYSICS

Spain (IRATRA)

Symbols used in formulas for strength and resistance — UNE 5019

542 EXPERIMENTAL CHEMISTRY. PREPARATIVE CHEMISTRY

United Kingdom (BSI)

Kohlrausch flasks — BS 615:1953

Haemacytometer counting chambers and dilution pipettes — BS 748:1953

Tests for performance characteristics of sintered filters — BS 1969:1953

542.1 CHEMICAL LABORATORY EQUIPMENT

Germany (DNA)

2 standards for laboratory glassware — DIN 12575, -12580

Poland (PKN)

8 standards for different laboratory equipment — PN C-60...

542.3 MEASUREMENT OF WEIGHT AND VOLUME

United Kingdom (BSI)

Density hydrometers and specific gravity — BS 718:1953

543 ANALYTICAL CHEMISTRY

Poland (PKN)

15 standards for different chemical analysis of fuel, etc — PN C-04...

547 ORGANIC CHEMISTRY

Poland (PKN)

3 standards for different organic compounds — PN C-88003/04, -99002

15 standards for different chemicals — PN C-80..., -84..., -87..., -88...

61 MEDICINE, HYGIENE, PHARMACY

Poland (PKN)

82 standards in the field of public health: hospitals, infirmaries, pharmaceutical, medical and surgical instruments — PN Section Z

614.84 FIRE, FIRE BRIGADE

Austria (ONA)

Motor fire engines — ÖNORM F 1065

Germany (DNA)

Suction hose, fire hose — DIN 14810/11

Rules for testing and acceptance of fire hose fitting — DIN 14070

List of DIN standards for different fire brigade equipment — DIN 14800

614.841 FIREPROOF MATERIALS

South Africa (SABS)

Standard specification for flameproof enclosures for electrical apparatus — SABS 314-1951

614.88 FIRST AID IN ACCIDENTS

Poland (PKN)

4 standards for different types of first-aid kits — PN Z-86111/12, -86311/12

614.89 PERSONAL SAFETY MEASURES AGAINST ACCIDENTS. SAFETY CLOTHING. MASKS. RESPIRATORS

South Africa (SABS)

Standard specification for barrier creams — SABS 433-1953

Standard specification for chemical resistant gloves — SABS 416-1953

United Kingdom (BSI)

Protective hats for motor cyclists — BS 2001:1953

615.47 SURGICAL INSTRUMENTS

Poland (PKN)

10 standards for surgeons' and veterinaries' instruments — PN Z-53..., -55..., -57..., -58...

615.478 MEDICAL AND SURGICAL FURNITURE

Poland (PKN)

5 standards for different surgical furniture — PN Z-78067, -78094, -78113/15

United Kingdom (BSI)

Hospital ward bedsteads for mental hospitals — BS 1979:1953

Hospital ward cots for adults — BS 1976:1953

Hospital ward cots for children — BS 1694:1953

615.84 ELECTROTHERAPY

Poland (PKN)

Electric apparatus for medical use — PN E-06205

Electro-shock treatment apparatus — PN E-89500

618 GYNECOLOGY

Hungary (MSZH)

2 standards for midwives' satchels — MNOSZ 4059, -4073

619 VETERINARY MEDICINE

Poland (PKN)

5 standards for veterinaries' surgical instruments — PN Z-55215, -55186/89

621-5 OPERATION. ADJUSTMENT AND CONTROL

Germany (DNA)

Different types of control knobs, levers, etc — DIN 6324

Netherlands (HCNN)

Glossary of terms and definitions used in automatic control systems — V 3009

621.01 MECHANICAL ENGINEERING IN GENERAL. THEORY

Poland (PKN)

82 standards in mechanical field, such as pipes, fittings, means of attachment, etc — PN Section M

621.1 STEAM. STEAM ENGINES. BOILERS

Germany (DNA)

Eye-bolts, tie-bolts used in locomotives — DIN 31221

Different hooks used in locomotives — DIN 36027

Fire bars — DIN 32001

Straight-way cock — DIN 33033

Water gage glass — DIN 33263

Folding stool — DIN 36145, -36147

Control hand wheels — DIN 30438

Survey of locomotive-type piping — DIN 31259

2 types of pipe gaskets — DIN 31263, -31270

Reduction bushing — DIN 31490

Grate bar bolts — DIN 32003

Water level cocks — DIN 33038/39

Pressure gage cock — DIN 33047

Pipe fittings — DIN 35772/73

Poland (PKN)

14 standards for different types of boiler firebox doors — PN M-34101, -34102, -34106, -34110/13, -34119/20, -34122/25, -34127

621.3 ELECTRICAL ENGINEERING. ELECTRICAL INDUSTRY

Australia (SAA)

Interim specification for wooden poles for overhead telecommunication and power lines — SAA Int 364, Nov 1952

Canada (CSA)

Canadian electrical code. Part I. Essential requirements and minimum standards governing electrical installations for buildings, structures, and premises—all potentials (6th edition) — CSA C22.1-1953

Germany (DNA)

Cartridge fuses up to 750 kv — DIN 49367/68

Electric thermoelements — DIN 43713

Small lead batteries — DIN 40733

Electrolytic capacitors, 6v to 100v, class 2 and 3 — DIN 41324

Poland (PKN)

Gages for Edison metric thread and thread of armored conduits — PN E-53003/6

Aluminum-alloy overhead lines PN E-90005
Lead covered telephone cable PN T-90008
Telephone cords PN T-90011/12

Switzerland (SNV)

Insulating tubes of compressed and hardened fabric VSM 11921

United Kingdom (BSI)

Tolerances on diameters of carbons for projection arcs and stage arcs BS 1964:1953
Primary cells and batteries for intrinsically safe bell signaling circuits in coal mines BS 1975:1953
Varnish-bonded, glass-covered round copper wire BS 1933:1953
Enameled round copper wire (oleo-resinous enamel) BS 1961:1953
Rubber-insulated cables and flexible cords for electric power and lighting BS 7:1953
Electricity meters: Part 3: single-phase 2-wire prepayment meters BS 37:Part 3:1953
Wire armored cables (vulcanized rubber insulated) for collieries BS 2008:1953
Cartridge fuse links for use in plugs BS 1362:1953
Polyvinyl chloride insulated cables and flexible cords for electric power and lighting BS 2004:1953

621.51 COMPRESSORS

United Kingdom (BSI)

Acceptance tests for turbo-type compressors and exhausters BS 2009:1953

621.64 DEVICES FOR CONVEYANCE AND STORAGE OF GASES AND LIQUIDS IN GENERAL

France (AFNOR)

Steel pipes electrically welded from hot and cold rolled strips FD A 48-102/03
14 provisory standards for different valves and pipe fittings used in the petroleum industry PN M 87-150/57, M 87-159/61, M 87-163, M 87-166/67

Germany (DNA)

7 standards for different fittings used in connection with central heating systems DIN 3841/47

India (ISI)

Lead pipes for other than chemical purposes I.S. 404

Poland (PKN)

6 standards for cast-iron pipes and fittings PN H-74. . .

Switzerland (SNV)

Smooth faced flanges, ND 10-4000 mm and NP 1-40 kg/sq cm VSM 18549, Bl.1/2
Smooth faced flanges, ND 10-1200 mm and NP 64-400 kg/sq cm VSM 18549, Bl.3
Groove faced flanges, ND 10-1000 mm and NP 2.5-16 kg/sq cm VSM 18565

United Kingdom (BSI)

Steel butt-welding pipe fittings for the petroleum industry BS 1640:1953

621.7 WORKSHOP PRACTICE

France (AFNOR)

Electrically welded tubes made of hot-rolled strips. Documentary specification NF FD A 48-102
Electrically welded tubes made of cold-rolled strips. Documentary specification NF FD A 48-103

Germany (DNA)

Rules for pattern making DIN 1511
Glass containers for preserved foodstuff DIN 6044
List of DIN standards related to packaging DIN 55400
4 standards for different parts of gas welding apparatus DIN 8542, -8546/47, -8549

Poland (PKN)

3 standards for different boxes for export PN D-79621, -79639, -79651
Definition of heat treatment PN H-01200
Hand sieves PN H-64020

United Kingdom (BSI)

Plain limit gages, limits and tolerances BS 969:1953
Mild steel drums (heavy and light duty removable heads) BS 2003:1953
Collapsible tubes BS 2006:1953

621.8 MACHINE PARTS. HOISTING AND CONVEYING MACHINERY. POWER TRANSMISSION. MEANS OF ATTACHMENT. LUBRICATION

Belgium (IBN)

Leather belting, vegetable tanned, specifications NBN 87

France (AFNOR)

4 standards for ball bearings and parts NF E 21-351, E 22-302, E 22-351, E 22-359

Germany (DNA)

Dimensions of the cabin and shaft for two-person elevator DIN 15307/08
Cross-drilled fillister head machine screws, metric DIN 404
2 types of square-head bolts, metric DIN 478, -480
Weldable metric threaded ends of different diameters DIN 525, Bl.1
2 types of hexagon-head machine screws, metric DIN 561, -564
3 types of headless set screws, metric DIN 913/15
Hexagon nuts, fine metric thread DIN 934, Bl.1
Two-part hollow rivets DIN 7331
Tubular rivets DIN 7339/10

Netherlands (HCNN)

Cylindrical gears: modules, symbols, indexes V 1630/31

Switzerland (SNV)

Involute gearing, symbols, definitions VSM 15522
Keys, deviations of keyways VSM 15142

United Kingdom (BSI)

Cotter slots BS 1660: Part 2:1953

621.9 MACHINE TOOLS. TOOLS. OPERATIONS, IN PARTICULAR FOR METAL AND WOOD

Netherlands (HCNN)

Table of standard rpm V 1936
Table of standard feed V 1937

Poland (PKN)

55 standards for different tools, machine tools, calipers, etc, all included in section PN M. . .

Switzerland (SNV)

Diameters of tap drills VSM 34212

United Kingdom (BSI)

Milling cutters BS 122: Part 1:1953
Quick-release tapers BS 1660: Part 3:1953
Accuracy of chucks for lathes and drilling machines BS 1983:1953
Classification of diamond powder in the sieve and sub-sieve ranges BS 1987:1953
Circular gear shaving cutters: accuracy BS 2007:1953
Mold die sets for injection molding machines BS 2012:1953
Dimensions of diamond truing tools BS 2002:1953

622 MINING

Germany (DNA)

5 standards for hose connecting fittings used in mining DIN 20029, -20033, -20035/36, -20038

Poland (PKN)

6 standards in general mining field PN Section G

624 CIVIL ENGINEERING

Australia (SAA)

Interim specification for piles (Eastern Australian hardwoods) SAA Int 365, Nov 1952

Austria (ONA)

Scaffolding: construction and application ÖNORM B 4007
Steel structure: design and calculation ÖNORM B 4300, parts 4, 6

Germany (DNA)

Admissible load for different building grounds DIN 1054
Wall thickness in different dwellings DIN 4106

Poland (PKN)

4 standards for concrete plates, pipes, etc PN B-02502, -06565, -06583, -14260
Technical specifications regulating reinforced concrete works PN B-06250
Wooden door frame construction PN B-06825
Prefabricated reinforced concrete beams and vaults PN B-82400, -82505

U.S.S.R.

Calculation of structure. Basic rules GOST 1644

United Kingdom (BSI)

Methods of test for stabilized soil BS 1924:1953

625.06 ROADS AND STREETS — BINDING MATERIALS AND THEIR USE

South Africa (SABS)

Standard specifications for bituminous road binders SABS 306/09-1951

625.1/.6 RAILWAYS AND TRAMWAYS

France (AFNOR)

Name plates for steam engines NF F 00-003
Axles with ordinary heads. Provisory standard PN F 05-007
5 standards for parts of signalization apparatus of funicular railways NF F 54-016/20

Germany (DNA)

Clamps for holding piping DIN 1592/93

Italy (UNI)

Cross section of the wheel tire of street car motor coach UNI 3332
Street car operator's adjustable seat UNI 3337
Position of sizes of route indicating tables UNI 3269

Poland (PKN)

8 standards for different accessories PN K-82. . .

U.S.S.R.

Track switch sleepers, wooden OST 2761

625.7/.8 ROADS

Israel (SII)

Concrete curbs SI 19

Poland (PKN)

7 standards for paving materials PN B-11100/04, -11127,-11130

United Kingdom (BSI)

Single-sized gravel aggregates for roads BS 1984:1953

646 CLOTHING

Hungary (MSZH)

4 standards for one- and two-piece overalls MNOSZ 4586/89

651 OFFICE ORGANIZATION. OFFICE MANAGEMENT

Denmark (DS)

Layout for paper forms, basic details DS 912
Note paper, size A 4 DS 913
Envelopes DS 914

Poland (PKN)

10 standards for different office supplies and equipment PN Section F

Announcing New Books . . . .

• Minimum Standard Requirements for Precast Concrete Floor Units, ACI Standard 711-53. (American Concrete Institute, 18263 West McNichols Road, Detroit 19, Mich. Published in *ACI Journal*, September 1953.)

This revised standard is the result of continuing work by ACI Committee 711 on Precast Floor System for Houses under the chairmanship of Professor F. N. Menefee, University of Michigan.

These are minimum standard requirements which in effect supplement the Building Code Requirements for Reinforced Concrete, ACI 318-51, American Standard A89.1-1951. They cover five different types of precast concrete floor units: (1) I-beam type, with either cast-in-place or precast slab; (2) hollow core type; (3) assembled concrete block type; (4) precast inverted T-beam joist with precast filler block between; and (5) integrally precast slab and T-joist. An appendix contains applicable sections of the ACI Code (ACI 318-51).

• There's a Right Ladder for Every Job. (American Ladder Institute, 666 Lake Shore Drive, Chicago 11, Ill. Single copies available without charge.)

In this interesting little booklet the wood ladder manufacturers themselves, through their American Ladder Institute, tell what to look for in selecting the right ladder for your job. "You wouldn't drive a spike with a tack hammer!" they say. "It's just as wrong to use the wrong ladder!" And they include a list of uses for which particular ladders have been made and are available. In this booklet they tell you about the wood used; they warn not to test your ladder; they tell how to select the ladders you need; they discuss the care and inspection of ladders; and tell about the American Standard Safety Code. "With ladders, a lot of knowledge, mixed with care and discretion, means safety," they point out. "It pays to be careful when personal safety is at stake." And they call on jobbers and dealers to help the customer select the right ladder since he is risking bodily injury if he uses a ladder improperly.

"The American Ladder Institute is an Association of manufacturers conscious of their responsibilities to the consumer, the dealer, and the jobber in supplying ladders that are built to recognized safety standards," they explain. "While no manufacturer needs to be affiliated with this organization to build ladders in conformity with these specifications, it is believed through the work that has been done in conjunction with the American Standards Association that the resulting Code and its adoption will further the interests of dealers, jobbers, consumers, and manufacturers of ladders, all of whose interests are similar, in using 'The Right Ladder for Every Job.'"

Every ladder user will find this "digest of things you should know about ladders" helpful. Individual copies will be sent free of charge on request to the American Ladder Institute.

• Recommended Practices for Spot Welding Aluminum and Aluminum Alloys. (American Welding Society, 33 West 39 Street, New York 18, N. Y. 33 pp, illus, $1.00)

More than four years of effort have gone into compilation of material and tests as the basis for this manual of practical design and manufacturing data. Included is a table showing the combinations of aluminum alloys which can and cannot be spot welded. Mechanical cleaning and specific chemical cleaning methods are given for removal of surface oxide and foreign matter prior to welding. Complete welding schedules are given and electrical and pressure characteristics of different machines illustrated. Weld defects are illustrated and causes discussed. The Appendix contains a bibliography.

British Standards Institution Yearbook 1953. (British Standards Institution, British Standards House, 2, Park Street, London, W.I, England, 1953. 488 pp. $3.00)

The Yearbook is a report of the work of the Institution. British Standards current as of March 31, 1953, are listed, and each is described briefly. Included, also, are the membership of the main Councils and Committees, standards being considered for approval, and British Standards under which Certification Trade Marks are used. Information is given on the availability in foreign countries of reference sets of British Standards. The agency service for the Canadian Standards Association, by which electrical products made in the United Kingdom and intended for export to Canada can be tested and inspected in the United Kingdom, is described.

Weldability of Steel. Robert D. Stout, Ph.D., and W. D'Orville Doty, Ph.D. (Welding Research Council, 29 W. 39 Street, New York 18, N. Y. Distribution by American Welding Society. 1953. 381 pp. $6.50)

Dr Stout, Professor of Metallurgy, Lehigh University, and Dr Doty, Welding Metallurgist, United States Steel Corporation, were commissioned by the Weldability Committee of the Welding Research Council to prepare this monograph. It represents a critical analysis and digest of the results of the many laboratory investigations carried on during the past 15 years on the weldability of carbon and low-alloy steels. Early chapters of the monograph cover briefly the fundamentals of welding processes and metallurgy, in relation to weldability. Basic factors which influence the weldability of carbon and low-alloy steels are discussed, and methods suggested for welding commonly used steels. An Appendix consists of 50 pages of tables classifying into three categories all of the standard specification steels (ASTM, SAE, ABS, and others). The categories are (1) those which are readily weldable; (2) those in which some precautions are needed; and (3) those which require special precautions and considerations.

AMERICAN STANDARDS

Status as of October 13, 1953

Legend

Standards Council — Approval of Standards Council is final approval as American Standard; usually requires 4 weeks.

Board of Review — Acts for Standards Council and gives final approval as American Standard; action usually requires 2 weeks.

Standards Boards — Approve standards to send to Standards Council or Board of Review for final action; approval by standards boards usually takes 4 weeks.

Building

American Standard Approved —

Building Code Requirements and Good Practice Recommendations for Masonry, A41.1-1953 (Revision of A41.1-1944)
Sponsor: National Bureau of Standards

In Construction Standards Board —

National Plumbing Code, A40.8 (Revision of A40.7-1949)
Sponsors: The American Public Health Association; The American Society of Mechanical Engineers

Method of Sampling Magnesium Oxychloride Composition and Ingredients, ASTM C 237-51; ASA A88.10

Method of Test for Sieve Analysis of Magnesium Oxychloride Compositions, Aggregates and Fillers, ASTM C 238-51; ASA A88.11

Method of Test for Sieve Analysis of Plastic Calcined Magnesia, ASTM C 239-51; ASA A88.12

Methods of Chemical Analysis of Magnesium Sulfate Technical Grade ASTM C 244-52; ASA A88.13

Methods for Chemical Analysis of Magnesium Chloride, ASTM C 245-52; ASA A88.14

Methods for Physical Testing of Magnesia for Magnesium Oxychloride Cements, ASTM C 246-52; ASA A88.15

Methods of Test for Ignition Loss and Active Calcium Oxide in Magnesium Oxide for Use in Magnesium Oxychloride Cements, ASTM C 247-52; ASA A88.16

Method of Test for Bulk Density of Magnesium Oxychloride Cements, ASTM C 248-52; ASA A88.17

Method of Slump Test for Field Consistency of Magnesium Oxychloride Cements, ASTM C 249-52; ASA A88.18

Specifications and Method for Field Determination of Specific Gravity of Gauging Solutions for Magnesium Oxychloride Cements, ASTM C 250-52; ASA A88.19

Method for Mixing Magnesium Oxychloride Cement Compositions with Gauging Solution (for Preparation of Specimens for Laboratory Tests), ASTM C 251-52; ASA A88.20

Method of Test for Linear Contraction of Magnesium Oxychloride Cements, ASTM C 252-52; ASA A88.21

Methods of Test for Linear Change of Magnesium Oxychloride Cement, ASTM C 253-52; ASA A88.22

Method of Test for Setting Time of Magnesium Oxychloride Cements, ASTM C 254-52; ASA A88.23

Method of Test for Consistency of Magnesium Oxychloride Cements by the Flow Table, ASTM C 255-52; ASA A88.24

Method of Test for Flexural Strength of Magnesium Oxychloride Cements, (Using Simple Bar with Two-Point or Single-Point Loading) ASTM C 256-52; ASA A88.25

Method of Test for Compressive Strength of Magnesium Oxychloride Cements, ASTM C 257-52; ASA A88.26
Sponsors: National Bureau of Standards; American Society for Testing Materials

Drawings and Symbols

American Standard Approved —

Letter Symbols for Radio, Y10.9-1953
Sponsor: The American Society of Mechanical Engineers

Reaffirmation Approved —

Graphical Symbols for Pipe Fittings, Valves and Piping, Z32.2.3-1949
Sponsors: The American Society of Mechanical Engineers; American Institute of Electrical Engineers

Electrical

American Standards Published —

Enamel-Coated Round Copper Magnet Wire, C9.1-1953, (Revision of C8.7-1936, C8.20-1939) $0.50

Cotton-Covered Round Copper Magnet Wire, C9.2-1953 (Revision of C8.5-1936) $0.35

Silk-Covered Round Copper Magnet Wire, C9.3-1953 (Revision of C8.6-1936) $0.35

Nylon-Fibre-Covered Round Copper Magnet Wire, C9.4-1953 $0.35
Sponsor: National Electrical Manufacturers Association

Specification for Rigid Steel Conduit, Zinc Coated, C80.1-1953 (Revision of C80.1-1950) $0.50
Covers the requirements for zinc-coated rigid steel conduit — as well as conduit couplings, elbows, bends, and nipples — for use as a raceway for the wires or cables of an electrical system.

Specification for Rigid Steel Conduit, Enameled, C80.2-1953 (Revision of C80.2-1950) $0.50
Covers the requirements for enameled rigid steel conduit — as well as conduit couplings, elbows, bends and nipples — for use as a raceway for the wires or cables of an electrical system.
Sponsors: Committee on Steel Electrical Raceways of the American Iron and Steel Institute; National Electrical Manufacturers Association

National Electrical Code, C1-1953 (Revision of C1-1951) (In different sizes) $3.00 $1.00 $0.10
Contains requirements designed to ensure the practical safeguarding of persons and of buildings and their contents from electrical hazards arising from the use of electricity for light, heat, power, radio, signaling and for other purposes.
Sponsor: National Fire Protection Association

American Standard Approved —

Household Automatic Electric Flatirons, C70.1-1953
Covers definitions, ratings, marking, methods of test, performance requirements, safety requirements, and durability requirements of household automatic electric flatirons. Provides a uniform procedure for testing flatirons for compliance with the standard.
Sponsor: National Electrical Manufacturers Association

In Electrical Standards Board —

Specifications for Soft or Annealed Copper Wire, ASTM B3-53T (Revision of ASTM B3-52T; ASA C7.1-1953)

Specifications for Hard-Drawn Copper Wire, ASTM B1-53T (Revision of ASTM B1-52T; ASA C7.2-1953)

Specifications for Bronze Trolley Wire, ASTM B9-53 (Revision of ASTM B9-52; ASA C7.5-1953)

Specifications for Tinned Soft or Annealed Copper Wire for Electrical Purposes, ASTM B33-53T (Revision of ASTM B33-52T; ASA C7.4-1953)

Specifications for Concentric-Lay-Stranded Copper Conductors, Hard, Medium-Hard or Soft, ASTM B8-53 (Revision of ASTM B8-52; ASA C7.8-1953)

Specifications for Hard-Drawn Copper Alloy Wires for Electrical Purposes, ASTM B105-53 (Revision of ASTM B105-52; ASA C7.10-1953)

Specifications for Rope-Lay-Stranded Copper Conductors having Bunch-Stranded Members for Electrical Purposes, ASTM B172-53T (Revision of ASTM B172-52T; ASA C7.12-1953)

Specifications for Rope-Lay-Stranded Copper Conductors having Concentric-Stranded Members for Electrical Conductors, B173-53T (Revision of B173-52T; ASA C7.13-1953)

Specifications for Bunch-Stranded Copper Conductors for Electrical Conductors, ASTM B174-53T (Revision of ASTM B174-52T; ASA C7.14-1953)

Specifications for Lead-Coated and Lead-Alloy Coated Soft Copper Wire for Electrical Purposes, ASTM B189-53T (Revision of ASTM B189-52T; ASA C7.15-1953)

Specifications for Hard-Drawn Aluminum Wire for Electrical Purposes, ASTM B230-53T (Revision of ASTM B230-52T; ASA C7.20-1953)

Specifications for Concentric-Lay-Stranded Aluminum Conductors, Hard-Drawn, ASTM B231-53 (Revision of ASTM B231-52; ASA C7.21-1953)

Specifications for Concentric-Lay-Stranded Aluminum Conductors, Steel Reinforced (ACSR), ASTM B232-53T (Revision of ASTM B232-52T; ASA C7.22-1953)

ASTM Method of Determination of Cross

Sectional Area of Stranded Conductors, ASTM B263-53T; ASA C7.29
Sponsor: American Society for Testing Materials

Reaffirmation Approved —

Wet Tests, C77.1-1943 (Reaffirmed 1953)
Sponsor: Electrical Standards Board

Specification for Electrical Metallic Tubing, Zinc Coated, C80.3-1950
Sponsors: Committee on Steel Electrical Raceways; American Iron and Steel Institute; National Electrical Manufacturers Association

Reaffirmation Requested —

Pool Cathode Mercury-Arc Power Converters, C34.1-1949
Sponsor: American Institute of Electrical Engineers

Fuels

American Standard Published —

Methods of Test for Specific Gravity of Gaseous Fuels, (ASTM D 1070-52; ASA Z69.1-1953) $0.40
Sponsor: American Society for Testing Materials

Gas-Burning Equipment

American Standards Approved —

Addenda to Approval Requirements for Gas Unit Heaters, Z21.16-1951, Z21.16a-1953

Addenda to Approval Requirements for Gas-Fired Room Heaters, Z21.11-1949, Z21.11b-1953

Addenda to Approval Requirements for Domestic Gas-Fired Incinerators, Z21.6-1949, Z21.6a-1953

Addenda to Approval Requirements for Domestic Gas Ranges Z21.1-1952, Z21.1a-1953

Approval Requirements for Gas Water Heaters, Z21.10-1953 (Revision of Z21.10-1950, Z21.10a-1951, and Z21.10b-1952)

Approval Requirements for Central Heating Gas Appliances, Volume IV, Gravity and Fan Type Vented Recessed Heaters, Z21.13.4-1953 (Revision of Z21.13.4-1951)

Approval Requirements for Domestic Gas Clothes Dryers, Z21.5-1953 (Revision of Z21.5-1940)
Sponsor: American Gas Association

Materials and Products

American Standards Published —

Copper and Copper-Base Alloy Forging Rod, Bar, and Shapes (ASTM B124-52; ASA H7.1-1953) $0.25

Free-Cutting Brass Rod, Bar and Shapes for Use in Screw Machines (SAE 72) (ASTM B16-52; ASA H8.1-1953) $0.25

Seamless Copper Pipe, Standard Sizes (ASTM B42-52; ASA H.26.1-1953) $0.25

Bronze Castings in the Rough for Locomotive Wearing Parts (ASTM B66-52; ASA H28.1-1953) $0.25

Car and Tender Journal Bearings, Lined (ASTM B67-52; ASA H29.1-1953) $0.25

Rolled Copper-Alloy Bearing and Expansion Plates and Sheets for Bridge and Other Structural Uses (ASTM B100-52; ASA H31.1-1953) $0.25

Brass Wire (ASTM B134-52; ASA H32.1-1953) $0.25

Leaded Red Brass (Hardware Bronze) Rod, Bar, and Shapes (ASTM B140-52; ASA H33.1-1953) $0.25
Sponsor: American Society for Testing Materials

Mechanical

In Board of Review —

Knurling, B5.30
Sponsors: The American Society of Mechanical Engineers; Metal Cutting Tool Institute; National Machine Tool Builders' Association; Society of Automotive Engineers

In Mechanical Standards Board —

Steel Pipe Flanges and Flanged Fittings, B16 (Revision of B16e-1939 and of Supplement B16e6-1949)
Sponsors: Heating, Piping and Air Conditioning Contractors National Assn; Manufacturers Standardization Society of the Valve and Fittings Industry; The American Society of Mechanical Engineers

Buttress Screw Threads, B1.9
Sponsors: The American Society of Mechanical Engineers; Society of Automotive Engineers

Designation and Working Ranges of Surface Grinding Machines of the Reciprocal Table Type, B5.32

Designation and Working Ranges of Plain Cylindrical Grinding Machines, B5.33
Sponsors: The American Society of Mechanical Engineers; Society of Automotive Engineers; Metal Cutting Tool Institute; National Machine Tool Builders' Assn

Standard Submitted —

Practices for Stationary Diesel Engines, B68
Sponsor: Diesel Engine Manufacturers Assn

Withdrawal of Standard Requested —

Acme and Other Translating Threads, B1.3-1941
Sponsors: The American Society of Mechanical Engineers; Society of Automotive Engineers

Reaffirmation Being Considered —

Markings for Grinding Wheels and Other Bonded Abrasives, B5.17-1949

Life Tests of Single-Point Tools made of Materials other than Sintered Carbide, B5.19-1946
Sponsor: The American Society of Mechanical Engineers

Reaffirmation Requested —

Nomenclature, Definitions, and Letter Symbols for Screw Threads, B1.7-1949
Sponsors: The American Society of Mechanical Engineers; Society of Automotive Engineers

Motion Pictures

Reaffirmation Approved —

Method of Determining Transmission Density of Motion Picture Films, Z22.27-1947 (Reaffirmed as PH22.27-1953)

Raw Stock Cores for 35-Mm Motion Picture Film, Z22.37-1944 (Reaffirmed as PH22.37-1953)

16-Mm Positive Aperture Dimensions and Image Size for Positive Prints Made from 35-Mm Negatives, Z22.46-1946 (Reaffirmed as PH22.46-1953)

Negative Aperture Dimensions and Image Size for 16-Mm Duplicate Negatives Made from 35-Mm Positive Prints, Z22.47-1946 (Reaffirmed as PH22.47-1953)

Theatre Sound Test Film for 35-Mm Motion Picture Sound Reproducing Systems, Z22.60-1948 (Reaffirmed as PH22.60-1953)

Sound Focusing Test Film for 35-Mm Motion Picture Sound Reproducers (Laboratory Type), Z22.62-1948 (Reaffirmed as PH22.62-1953)

Scanning-Beam Uniformity Test Film for 35-Mm Motion Picture Sound Reproducers (Service Type), Z22.65-1948 (Reaffirmed as PH22.65-1953)

Scanning Beam Uniformity Test Film for 35-Mm Motion Picture Sound Reproducers (Laboratory Type), Z22.66-1948 (Reaffirmed as PH22.66-1953)

1000-Cycle Balancing Test Film for 35-Mm Motion Picture Sound Reproducers, Z22.67-1948 (Reaffirmed as PH22.67-1953)

Sound Records and Scanning Area of Double Width Push-Pull Sound Prints, Normal Centerline Type, Z22.69-1948 (Reaffirmed as PH22.69-1953)

Sound Records and Scanning Area of Double Width Push-Pull Sound Prints, Offset Centerline Type, Z22.70-1948 (Reaffirmed as PH22.70-1953)
Sponsor: Photographic Standards Board

In Board of Review —

Specifications for 3000-Cycle Flutter Test Film for 16-Mm Sound Motion Picture Projectors, PH22.43 (Revision of Z22.43-1946)

Specifications for Multi-Frequency Test Film for Field Testing 16-Mm Sound Motion Picture Projection Equipment, PH22.44, (Revision of Z22.44-1946)
Sponsor: Photographic Standards Board

Rubber

American Standard Published —

Sample Preparation for Physical Testing of Rubber Products (ASTM D 15-52T; ASA J1.1-1953) $0.25
Sponsor: American Society for Testing Materials

Safety

American Standard Published —

Safety Color Code, for Marking Physical Hazards and the Identification of Certain Equipment, Z53.1-1953 (Revision of Z53.1-1945) $0.50
Sponsor: National Safety Council

"Standards Are *Your* Business."

This 24-page booklet, defining standards of production and their value as tools of management, appears in a new, revised edition just issued by the American Standards Association to emphasize the economic importance of standardization.

The booklet gives the philosophy and objectives of the voluntary standards movement in this country and contains considerable new material, including a section on Federal Government policy toward industry standards. Included are specific examples of recent savings through standardization effected by leading U.S. corporations which are named.

Copies are available without charge from the American Standards Association.

What's New on American Standard Projects

Safety Code for Elevators, Escalators, and Dumbwaiters, A17 —

Sponsor: American Institute of Architects; National Bureau of Standards; The American Society of Mechanical Engineers

A correction slip is being distributed to be pasted over section "b—Private Residence Elevator," page 4, of the new American Standard Safety Code for Private Residence Elevators, A17.1.5-1953. With this correction the definition of "private residence elevators" now reads:

"A private residence elevator is a power passenger electric elevator, installed in a private residence and which has a rated load not in excess of 700 pounds, a rated speed not in excess of 50 fpm, a net inside platform area not in excess of 12 square feet, and a rise not in excess of 50 feet."

Ball and Roller Bearings, B3—

Sponsor: Mechanical Standards Committee

A new subcommittee on Load Rating of Ball and Roller Bearings has been organized. Gunnar Palmgren, vice-president in charge of engineering and research, SKF Industries, Philadelphia, Pa., is chairman. This subcommittee is trying to develop a proposed American Standard. Also, the subject is under consideration in ISO/TC 4, on Ball and Roller Bearings, with a view to international unification.

Small Tools and Machine Tool Elements, B5—

Sponsors: Metal Cutting Tool Institute; National Machine Tool Builders' Association; Society of Automotive Engineers; The American Society of Mechanical Engineers

On recommendation of Sectional Committee B5, the American Standards Association has arranged with the International Organization for Standardization to take an active part in the work of ISO Technical Committee 29 on Small Tools and on ISO Technical Committee 39 on Machine Tools. Also on recommendation of Committee B5, ASA has arranged for observer status in the work of Technical Committee 32 on Splined Shafts and Hubs. The French standards association holds the secretariat for these ISO technical committees.

Code for Pressure Piping, B31 —

Sponsor: The American Society of Mechanical Engineers

INTERPRETATIONS
Submitted by the Sponsor

Pending revision of the Code for Pressure Piping, ASA B31.1-1951, the Sectional Committee has recommended that selected interpretations be published so that industry may take immediate advantage of corresponding proposed revisions. Case No. 13 is published herewith. This represents interim actions of Sectional Committee B31 on the Code for Pressure Piping but will not constitute a part of the Code until formal action has been taken by ASME and ASA on a revision of the Code.

Case No. 13

Inquiry: What is the status of the "Report of Task Force on Flexibility, May 4, 1953" and Par. 620 in the 1951 Edition of the Code?

Reply: It is the opinion of the Committee that until a new edition of the Code is published revising Par. 620, any of the following procedures will meet the intent of the Code as it applies to piping flexibility.

(*a*) Follow the present wording of the Code, Par. 620.

(*b*) Follow the proposed revised wording given in the "Report of Task Force on Flexibility, May 4, 1953."

(*c*) Follow the proposed wording in the above Task Force Report, but use the alternate paragraphs contained in the report.

Transformers, Regulators, and Reactors, C57 —

Sponsor: Electrical Standards Committee

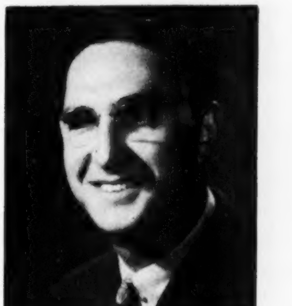
A Proposed American Standard on Distribution Transformers, conventional subway type, is now being circulated for trial to obtain comments on its suitability for approval as American Standard.

This document, known as "EEI-NEMA Recommended Standards for Distribution Transformers," is the first report of the Joint Committee of the Edison Electric Institute and National Electrical Manufacturers Association on Standards for Distribution Transformers. It contains design standards for certain mechanical and electrical features of conventional subway type distribution transformers with high voltage 2400-15,000 volts, low voltage 600 volts and below, rated 167 kva and smaller single phase, 150 kva and smaller three phase. It was originally published in March 1951 as NEMA Publication No. 113-1951 and as EEI Publication No. 51-3. It is now being distributed for trial and study by the American Standards Association.

Electronic Components, C83—

Sponsor: Radio-Television Manufacturers Association.

A new committee in the field of electronic components — Sectional Committee C83 — has been organized in the Communications Division of the ASA Electrical Standards Board.



Leon Podolsky

Leon Podolsky, technical assistant to the president of the Sprague Electric Company, North Adams, Massachusetts, has been appointed chairman of the committee, which will be concerned with standards, specifications, methods of testing, and rating for components used in electronic circuits. The Radio-Television Manufacturers Association will take the administrative leadership in the new committee's standards work.

Mr Podolsky is chairman of RTMA's International Standards Committee, a member of the Institute of Radio Engineers and a national di-

rector of its professional group on Electronic Components, a member of the American Institute of Electrical Engineers and the American Association for the Advancement of Science.

Institutional Textiles, L24 —

Sponsor: American Hotel Association

Clifford R. Gillam has been appointed chairman of the Committee on Institutional Textiles. Mr Gillam is general manager of the Buck Hill Falls Company. The committee, which held its first meeting October 7, is concerned with the development of specifications, test methods, and performance requirements of fabrics used in hotels or resort homes.

Photo: Louis Garcia

Clifford R. Gillam

Mr Gillam brings to the committee experience as vice-president, and as director of the Pennsylvania Hotels Association; as chairman, Resort Hotels Committee of the American Hotel Association, and chairman, Research Committee of the American Hotel Association.

Chairmen of five technical groups were appointed at the committee's meeting October 7.

John K. Odin, merchandising manager, Goodall Fabrics, Inc, New York, was named chairman of Institutional Furnishings; M. S. Hyman, president, N. W. Baker Linen Co, New York — Utility Textiles; Charles Humphrey, treasurer, Institute of Industrial Launderers, Detroit — Work Clothes; and Albert Silverman, executive vice-president, Angelica Uniform Co, St Louis — Uniforms for Men and Women.

WHAT IS YOUR QUESTION?

There seem to be many discrepancies between dimensions of malleable-iron screwed pipe fittings used by our drafting room and dimensions of actual fittings now being manufactured. Can you suggest any way we can check these dimensions?

The 1951 edition of the American Standard Malleable-Iron Screwed Fittings, 150 Lb, B16.3-1951, contains the most recent tables of dimensions agreed upon by representatives of manufacturers and users of pipe fittings. Sectional Committee B16 on Pipe Flanges and Fittings is sponsored by the American Society of Mechanical Engineers; Heating, Piping and Air Conditioning Contractors National Association; and the Manufacturers Standardization Society of the Valve and Fittings Industry.

Where can we find a test for coated abrasives?

From the National Bureau of Standards comes a further reply to this question, answered originally on page 208 of the July 1953 issue. This reply was based on the assumption that only a performance test is desired, the NBS letter comments. "If this is correct, then the reply, so far as I know, also is correct," our correspondent continues. However, he says, there are other tests for coated abrasives in Federal specifications, as well as some Simplified Practice Recommendations issued by the Department of Commerce. Both are listed on the last page of Letter Circular LC 1007, "Artificial Abrasives and Abrasive Products," issued by the National Bureau of Standards, U. S. Department of Commerce, Washington 25, D. C.

I understand that you have information on standards and methods of test for ceramic dielectrics.

This question, too, was answered on page 208 of the July 1953 issue. From the National Bureau of Standards comes word that there are some joint Army-Navy specifications dealing with dielectrics that were not listed in our reply. He refers to the following:

JAN-I-10, with Amendment 2, dated January 12, 1949, for Insulating Materials, Ceramic Radio, Class L.

JAN-I-12, with Amendment 2, dated January 6, 1949, for Insulating Materials, Ceramic Radio Dielectric, Class H.

JAN-C-20A, with Amendment 1, dated January 6, 1949, for Capacitors, Fixed, Ceramic Dielectric (Temperature-compensating)

Copies of these joint Army-Navy specifications may be obtained upon application to the Bureau of Supplies and Accounts, Department of the Navy, Washington 25, D. C.

Office Standards, X2 —

Sponsor: National Office Management Association

Following a reorganization, this sectional committee is voting on approval of six proposed standards. They are:

Reflectances of Furniture for General Office Use, X2.1.3

Definition of Posture Chair, X2.1.4

Operating Voltage Range of Office Dictation Machines, X2.5.16

Maximum Electrical Leakage of Dictating Machines, X2.5.17

Template and Method of Attaching Dictating Machine Secretarial Hand Controls to Typewriters, X2.5.18

Length of Cables for Office Dictation Machines, X2.5.19

• • **Scales for visual evaluation of color fading,** which a technical committee of the International Organization for Standardization is considering for recommendation as world-wide standards of color-fading measurement, are now available from the American Association of Textile Chemists and Colorists. British grey scales are $1.50 a scale, but the AATCC notes that two different scales are needed to make complete readings. German scales for the same purpose are also obtainable at $3.00 for a set of two from AATCC, 101 West Thirty-first Street, New York 1, N. Y. AATCC urges that industry give these scales an active trial before ISO acts on them.

• • **Lester W. Benoit,** executive secretary of the Manufacturers Standardization Society of the Valve and Fittings Industry, has been elected vice-chairman of the Conference of Executives of Organization Members of ASA. This post, was recently created by an amendment to the CEOM By-Laws providing for two vice-chairmen. Mr Benoit has been a member of the CEOM Executive Committee since December 1948. In addition, he sits on the Mechanical Standards Board and is secretary of two sectional committees: B16, Standardization of Pipe Flanges and Fittings, and B31, Code for Pressure Piping.

• • **Recent changes in American Standard and Unified screw threads** are recognized in the new edition of American Standard Spindle Noses and Arbors for Milling Machines, B5.18-1953. The standard was developed by the Sectional Committee on Small Tools and Machine Tool Elements, B5, sponsored by the Metal Cutting Tool Institute; the Society of Automotive Engineers; the National Machine Tool Builders' Association; and The American Society of Mechanical Engineers. Copies are now available at $1.00 each.

• • **Professional training classes in Building Department Administration** are now being held under the auspices of the Civic Center Division, University of Southern California's School of Public Administration and the Pacific Coast Building Officials Conference. Three classes are being given, two on an undergraduate level and one for graduate work. Forty students are registered. The first course covers the history and authority of building departments, their operations, and problems in building inspection and enforcement of building regulations. The second course will discuss the interpretation and enforcement of the Uniform Building Code. The graduate course on "Advanced Building Department Administration" is using the Uniform Building Code and the book, *Modern Building Inspection*, as texts.

According to reports from Hal Colling, managing-secretary of the Pacific Coast Building Officials Conference, similar courses are being considered in other areas. An initial three-day course (December 1, 2, and 3) will be held at Washington State College as a trial.

• • **Light metals and their alloys** are to be the subject of a new technical committee of the International Organization for Standardization. The committee was authorized by the ISO Council at its meeting in July. The French standards association has been assigned the secretariat. Scope of the work has been defined by ISO as: "The light metals under consideration are aluminium and magnesium. Their alloys are metal compounds the principal element of which is aluminium or magnesium."

• • **A Modular Society** has been organized in Great Britain to coordinate dimensions of building materials and equipment. Among the original members of the new society are the president of the Council of the Royal Institute of British Architects, the chairman of the Royal Society of Arts, and the director of the Building Center. At its first meeting last January, H. A. R. Binney, director of the British Standards Institution, welcomed the new organization and expressed confidence that it would work in harmony with the BSI, which has been studying the problem of modular coordination. Chairman of the Modular Society is Alfred C. Bossom, who for many years was an architect in the United States. He reports that the group hopes to exchange information with the American Standards Association's Committee A62 on Modular Coordination and with the American Institute of Architects and the Producers' Council, which sponsor this ASA project.

"Unusual Accidents"

(*Continued from page* 335)

Safety Standards series when understood and applied by plant supervisors. For rulings in unusual cases, see STANDARDIZATION, March, 1953; February, 1953; January-June, 1952; March-June, August, September, and November, 1951; March and April, 1950; July, 1948; and June, 1947.